Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

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Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0 General and theoretical
1 Fish by species
2 Fresh fish
3 Preserved fish
4 Oils
5 Vitamins
6 Fishery byproducts
7 Analytical Methods
8 Composition
9 Miscellaneous

Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget November 23, 1956.

0.36 SLOW FREEZING OF CARP MUSCLE AND INOSINIC ACID FORMATION

Saito, Tsuneyuki and Arai, Ken-ichi (Hokkaido University, Hakodate, Japan)
Nature 179, 820-821 (April 20, 1957)

If fresh carp muscles are frozen at very low temperature, such as by sudden immersion in liquid propane or in liquid nitrogen, no significant change occurs in the amounts of adenosine triphosphate or creatine phosphate present. Changes, however, do occur in fresh muscle of carp during storage at -8° C. When carp muscle was frozen slowly, the amounts of adenosine triphosphate and creatine phosphate decreased very rapidly and the amounts of compounds such as inosine monophosphate increased greatly.

In this study, an attempt has been made to observe the formation of inosine monophosphate during the course of slow freezing of carp muscle.

Experimental. -- Fresh dorsal muscle of carp (1 gm.) was solidified by freezing for 5 hours at -8° C., and homogenized with 20 milliliters (ml.) of 4-percent perchloric acid solution at low temperature. The perchloric acid extract obtained was filtered and fractionated by ion-exchange chromatography. Optical densities of each of the fractions were measured at 250 and 260 millimicrons (mμ), and their ratios were calculated. The substance which indicated the highest value of this ratio or almost 1.5 was eluted mainly in fraction D. This compound may be considered to be inosine monophosphate. A quantity of this compound was accumulated and, after having been neutralized to pH 7.0 with sodium hydroxide, was evaporated to a small volume under reduced pressure and at temperatures below 45° C. The compound then was absorbed completely by passing the condensed eluate through a Norite column. After this column had been washed several times with distilled water, the material was treated with 50-percent alcoholic 0.01 molar ammonia solution and evaporated to dryness under

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 ABSTRACTER: Martin Heerdt

2.01 VOLATILE BASES AS QUALITY INDICES OF ICED NORTH SEA COD

Shewan, J. M. and Ehrenberg, A. S. C. (Department of Scientific and Industrial Research, Food Investigation Organization, Torry Research Station, Aberdeen, Scotland)
Journal of the Science of Food and Agriculture 8, 227-231 (April 1957)

Introduction. -- Nine series of North Sea and Iceland cod fish obtained from February to November of 1953 were examined in an attempt to determine whether or not the volatile base content can be used as a chemical index of the eating quality of the fish. Two chemical and four sensory variables were measured on the same cuts of different fish, on different cuts of the same fish, and on cuts from similarly treated fish both raw and cooked.

Experimental procedures. -- The fish were gutted, washed, and packed in boxes with ice on board ship. They were re-iced in the laboratory at regular intervals, and analyzed in batches of six every three or four days over a period of 3 weeks. The two chemical variables, trimethylamine (T.M.A.) content and total volatile base (T.V.B.) content of the fish muscle were estimated by the modified Conway method using a middle cut of each fish and are expressed as 10·log(1 plus mg. N per 100 c.c. muscle extract). The sensory variables, odor and appearance, of both raw and cooked middle cuts, were assessed by a trained panel using scoring scales of 0 to 10.

Results. -- Spoilage curves for the six variables were plotted using equations obtained from the experimental data. These curves were all approximately linear, but tended to vary for a given variable from one batch to another. The odor scores of the raw fish showed a daily decrease of 0.33 to 0.47 units in the different catches from initial values of 9.5 to 10. The appearance scores behaved in a similar manner except that they tended to lie about a third of a unit lower for all but the freshest and stalest specimens. The odor scores of the cooked fish decreased by 0.28 to 0.35 units per day

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 ABSTRACTER: Claude Thurston

2.01 THE USE OF TETRAZOLIUM SALTS FOR ASSESSING THE QUALITY OF ICED WHITE FISH

Shewan, J. M. and Liston, J. (Department of Scientific and Industrial Research, Food Investigation Organization, Torry Research Station, Aberdeen, Scotland)
Journal of the Science of Food and Agriculture 8, 222-226 (April 1957)

Introduction. --At present, quality in the fishing industry's distribution chain is determined almost exclusively by sensory means. The need has long been felt for a means of checking organoleptic results with an independent objective method. Many have been suggested but none have been adopted. A promising procedure involves treating iced gutted white fish with a moistened test paper impregnated with a solution of 2-p-iodophenyl-3-p-nitrophenyl-5-phenyltetrazolium chloride applied to the moist surface of the fish. The strips are left in contact with the fish for two minutes, dried fifteen minutes to develop the color, and treated for 15 minutes in 10 milliliters of a 3-percent phenolic ethanol solution to dissolve the color. The solution is filtered and the filtrate measured for percentage of transmission at 5500 Å using a blue filter. Values are corrected by means of a blank run.

Results. -- A wide variety of haddock samples obtained over a period of two years were tested according to the above procedure. The data show that there is a close parallel between the curves for the tetrazolium salt and the viable bacterial count. Similar comparisons were made with the other organoleptic methods.

Another example of the tetrazolium method for assaying quality is provided by the results of an experiment in which two lots of codling were allowed to spoil under identical conditions except that the bacterial loads on the two lots of fish were widely different. In the first lot the fish were washed

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 ABSTRACTER: Claude Thurston

2.112 FISHING METHODS AND GEAR

Miyamoto, H.
International Shipbuilding Progress 2, No. 11, 291 (1955) (Rotterdam, Netherlands)
World Fisheries Abstracts 8, 15-16 (January-February 1957)

The author refers to a study by M. Tauti (Japan), 1925, on the resistance of plane nets in water. Tauti studied the types of netting which would be used in purse seines, trawl nets and fixed nets; they were made of cotton, Manila twine or ramie, the diameter of threads measuring from 0.7 to 3.0 mm. (1/32 to 3/64 in.) and sizes of stretched mesh from 1.5 to 30.2 cm. (19/32 to 12 in.) woven in flat knot or trawler knot, (see over). He introduced the following formula for the resistance of a net as it is towed at an angle of attack 0 : $r = k_0 v^2$; in which r = resistance of net per unit area, v = speed of net in motion under water, k_0 = coefficient of resistance of net at angle of attack 0, depending on the construction of the gear. For the angle of attack 0 = 0°, the value k_0 was constant (1.8 kg./m^2 or 0.37 lb./sq. ft.) and for 0 = 90°, $k_0 = 382 \frac{d}{l}$, if v is in m./sec. (d = diam. of thread; l = size of the stretched mesh).

Mr. Tauti pointed out that there should be some difference in the hydrodynamic resistance between flat knot nets and trawler knot ones, and he carried out experiments on the resistance of nets with various types of knots. The piece of net under test was stretched in square mesh on a brass pipe frame of 2 cm. (3/4 in.) external diameter and hung vertically from the rear platform of the carriage over the experimental basin. The effective area of the net is 1 x 1 m. (3.3 x 3.3 ft.). The brass frame was connected with the towing level of the dynamometer and submerged to a sufficient depth. The author tested nets of cotton, Manila twine and ramie of both flat knot and trawler knot types, nets of synthetic fibers such as vinylon (polyvinyl group) and Amilan (polyamide group) of trawler knot. In addition, experiments on knotless or woven nets were conducted.

(over)

 ABSTRACTER: J. G. de Wit

SLOW FREEZING OF CARP

FISH SPOILAGE TEST

VOLATILE BASE IN ICED COD

RESISTANCE OF PLANE NETS

2.01

and stored in clean ice, whereas the latter were unwashed and stored in dirty ice (ice with a bacterial count of 106 per square centimeter). Organoleptic tests showed that the spoilage time was delayed from two to four days for the fish stored in clean ice. The tetrazolium method did not show a difference until after the fifth day. This was attributed to the apparent fact that significant amounts of formazan are formed only after the bacterial count reaches 106 per square centimeter.

Conclusions. -- Despite numerous discrepancies, the tetrazolium method offers distinct promise of being a most useful tool for assessing the quality of iced fish. Its many advantages include simplicity, speed, lack of damage to the fish, and testing without removing the fish from sale. Larger numbers can be tested giving more accurate estimates of the overall quality of large batches.

2.112

The resistance characteristic k of the formula $r = kv^2$ of cotton nets having 3 different types of knot is as follows:

for knotless net: $k = 172\left(\frac{d}{l}\right) + 3.70\left(\frac{d}{l}\right)^2$

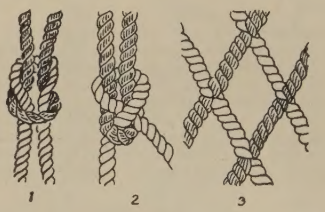
for flat knot net: $k = 170\left(\frac{d}{l}\right) + 4.33\left(\frac{d}{l}\right)^2$

for trawler knot net: $k = 168\left(\frac{d}{l}\right) + 4.75\left(\frac{d}{l}\right)^2$

In this experiment the threads of the knotless net consisted of 2 plies. For the flat knot and the trawler knot nets, 3-ply threads were used.

Types of knots

1. Flat knot.
2. Trawler knot.
3. Knotless or spliced net.



0.36

reduced pressure. The residue of inosine monophosphate was dissolved in water.

Assay. -- Several methods were used to determine if the compound obtained above actually was inosine monophosphate. When the ultraviolet absorption spectra of the compound were measured, absorption maxima were found at 253 mμ (pH 11.2 in sodium hydroxide), 251 mμ (in 2N hydrochloric acid), 249 mμ (pH 6.0 in water), and 249 mμ (pH 2.0 in hydrochloric acid). These maxima agree exactly with those of authentic inosine monophosphate. A paper chromatograph also was used to identify the compound as inosine monophosphate, and R_f values obtained were 0.31 in 69-percent n-butyric acid and 0.85-percent sodium hydroxide, and 0.84 in water at pH 10. These R_f values are approximately equal to those of inosine monophosphate.

Conclusions. -- If carp muscle is frozen slowly under mild conditions such as -8° C. the amounts of adenosine triphosphate and creatine phosphate decrease very rapidly and inosine monophosphate is formed in quantity. The theory of the relationship between the disappearance of adenosine triphosphate or creatine phosphate and the formation of inosine monophosphate under the conditions of mild freezing have not been clarified. Deamination, however, takes place very rapidly under the above conditions.

2.01

for the different catches. The flavor scores varied in a similar manner but were from 0.1 to 0.2 units higher than the odor values. Little change was noted for the chemical variables during the first few days. After this, the T.V.B. increased at rates of from 0.35 to 0.47 units per day for the different catches, and the T.M.A. at rates of 0.66 to 0.97 units. Changes occurring during rigor usually caused a decrease in the T.V.B. content during the first few days. All variables, both chemical and sensory, differed from catch to catch.

Conclusions. -- It is clearly established that iced fish from different catches spoil at different rates as measured by sensory factors and volatile base development. This is true of catches from the same area and it does not appear to be seasonal. Neither the T.V.B. nor the T.M.A. content of the fish muscle are consistently related to the sensory quality-factors except within rather broad limits. The lack of correlation in chemico-sensory relations is probably due to different amounts of chemical substrates such as trimethylamine oxide originally present in the fish as well as to differences in the bacteriological flora. The volatile bases content of fish muscle does not serve as a precise index of eating quality. In using it, different indices might have to be used for different fishing grounds. However, a study of volatile bases content should play an important role in experimental studies on the spoilage of white fish.

2.1121 DANISH SEINING IN CANADA

Anonymous
Trade News 9, 3-6 (April 1957)

The Danish seine method of fishing was invented by a fisherman named Jans Vaever in Denmark in 1848. It is now one of the more important forms of fishing in Europe and employs thousands of fishermen who catch a wide variety of fish.

Danish seining consists of surrounding a large area of sea bed with two very long ropes and a net in such a way that when the ropes are pulled in and the area enclosed by them becomes smaller, the fish on or near the bottom are driven into the center where they are collected by the moving net. The Danish seine can be operated successfully only on grounds that are smooth and free of rocks, coral, and boulders, and free of strong currents.

There are two forms of Danish seining; anchor fishing and fly dragging. In the former, the gear is set out from an anchor to which the boat, after laying out the ropes and seine, returns and ties up for hauling the gear. In fly dragging, a buoy is used instead of the anchor and, after the gear has been set out, the boat picks up the buoy and cruises slowly ahead while hauling the seine. An outline of the fishing technique and the net are shown in figures 2 and 3.

See illustrations, over.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

2.1178 SCALLOPS -- AND SCALLOP DREDGES

Mason, James and Baird, R. H. (Fisheries Division, Scottish Home Department)
World Fishing 6, 35-37, 39 (April 1957)

The scallop is a shellfish closely related to the oyster. The shell consists of two strongly ribbed valves joined together by an almost straight hinge. Scallops occur most frequently on sandy gravel sea bottoms, although some are found on muddy sand. They live in depths of from 4 or 5 to 100 fathoms, but are most abundant between 10 and 20 fathoms.

Although the scallop normally lies on the sea bottom with its flat valve uppermost, it has the ability to swim. This is accomplished by energetic flapping of the shell valves.

Upon opening the scallop shell, it is possible to see, in addition to the white muscle and orange colored frill, the red and white gonads, the orange-colored gills, the brown kidney and the black liver. (See diagram).

In the United Kingdom, scallops are usually caught by means of a dredge towed along the sea floor. The dredge consists of an iron frame bearing a toothed crossbar that scrapes scallops from the sea-bed into a bag attached to the frame. The belly of the bag is constructed of rings of $\frac{1}{4}$ inch steel which have a diameter of 3 to 4 inches, and the back is of sisal net measuring 2 to 3 inches from knot to knot. The width of the frame varies from $3\frac{1}{2}$ to 6 feet according to the size of the boat used.

The boats fishing for scallops range up to 50 or 60 feet in length, work from two to four dredges, and land their catches daily.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

2.116 AN EXPERIMENTAL AIR-PRESSURE DEPTH-METER FOR USE WITH MIDWATER TRAWLS

Smith, Keith A. (U. S. Fish and Wildlife Service, Boothbay Harbor, Maine)
Commercial Fisheries Review 19, 6-10 (April 1957)

The need for a depth indicator for use with midwater trawls became apparent during early midwater trawl tests and fishing trials. For fishing success with this type of gear it is necessary to know the exact fishing depth of the net. Measurement of depression angles of the towing warp gives an approximate net depth but is not sufficiently accurate under many fishing conditions.

To meet the practical needs of midwater trawling, an experimental depth-meter was built.

The design of the depth-meter was based on the fact that the determination of pressure at any point in an open body of sea water of a given density is tantamount to knowing the depth at that point. Therefore, if a continuous and unobstructed column of air confined inside a tube could be maintained from the foot rope of the trawl to the deck of the fishing vessel, the air pressure at the top of the tube must equal the pressure at the bottom of the tube (minus the negligible weight of the air in the tube). If such a tube were open to the water at the bottom end, the pressure throughout the tube must be equal to the water pressure at the depth of the bottom end of the tube, provided sufficient air remained in the tube at all times to prevent any water from entering the tube. It was decided that the best way to insure that such a tube remain clear of water would be to add air continuously at the top of the tube and force a small amount of air out of the tube at the open bottom end.

Following preliminary tests, the following gear components were assembled to operate on the principles outlined above:

1. A source of compressed air. (A standard compressed air cylinder containing 300 cubic feet of air at a maximum pressure of approximately 2,000 pounds per square inch (p. s. i.) was used. A regulator valve was added to give a reduced and constant pressure.)
2. A group of three needle valves to control the flow of air into the pressure tube.
3. A simple air pressure gauge. (The gauge originally used was calibrated in five p. s. i. steps,

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 ABSTRACTER: Kathryn L. Osterhaug

2.9 SUPPLEMENTARY FOOD COMPOSITION TABLE

Hayes, Olive B. and Rose, Gertrude (Department of Nutrition, Harvard School of Public Health, Boston, Massachusetts)
Journal of the American Dietetic Association 33, 26-29 (January 1957)

Table 1. Supplementary composition figures for some fat-containing foods (household portions)

FISH							
Food	Serving		Calories	Protein		Fat	
	Amount	Weight		Animal	Vegetable	Animal	Vegetable
		gm.		gm.	gm.	gm.	gm.
Cod	1 serving	120	89	19.8	--	0.5	--
Flounder	1 serving	120	82	17.9	--	0.6	--
Frog	2-3 large legs	100	73	16.4	--	0.3	--
Haddock	1 serving	120	95	21.8	--	0.1	--
Halibut	1 serving	120	151	22.3	--	6.2	--
Lobster, canned	1/3 c.	50	46	9.2	--	0.7	--
Mackerel, Atlantic	1 serving	120	226	22.4	--	14.4	--
Oysters *	1 c. (13-19 medium oysters)	240	200	23.5	--	5.0	--
Salmon, Pacific	1 serving	120	268	20.9	--	19.8	--
Sardines, Atlantic (drained solids)	1 piece, 3x1½ x 1 in.	50	107	12.9	--	5.5	--
Shrimp, canned, dry pack	4-6 shrimp	50	64	13.4	--	0.7	--
Tuna, canned, drained solids	1/3 c. scant	50	99	14.5	--	4.1	--

 Reprinted in part

DANISH SEINE OPERATION

AIR PRESSURE DEPTH-METER

SCALLOP DREDGING

COMPOSITION OF FISH

2.116

but it was found that a more sensitive gauge with finer graduations was needed. For best results, the gauge should be graduated in steps no greater than two p. s. i.

4. 100 fathoms of 3/16" inside diameter reinforced rubber hose designed for a maximum working pressure of 300 p. s. i.

5. 100 fathoms of 3/8" diameter rope to support the hose.

The gear is assembled as shown in figures 1 and 2. Within close limits the depth indicator has been found to be accurate and dependable.

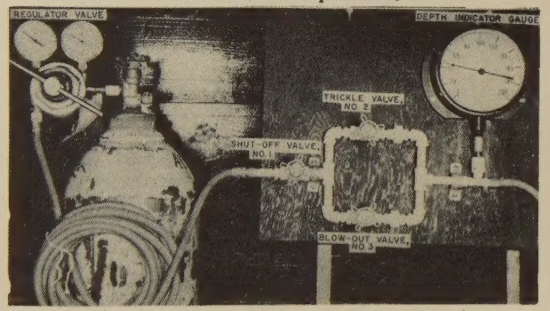


Fig. 1. Air supply, regulator gauge, control valves, and depth-pressure indicator gauge assembled to indicate depth.

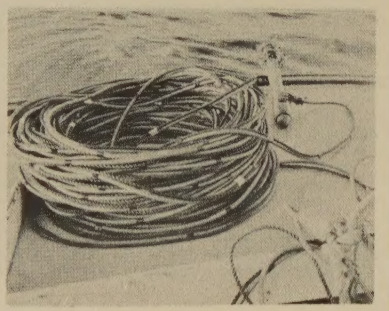


Fig. 2. 100 fathoms of pressure hose supported by nylon rope, 3/8" in diameter fastened at 18" intervals with plastic electrician's tape. Bathythermograph was used for checking depth readings.

2.1121

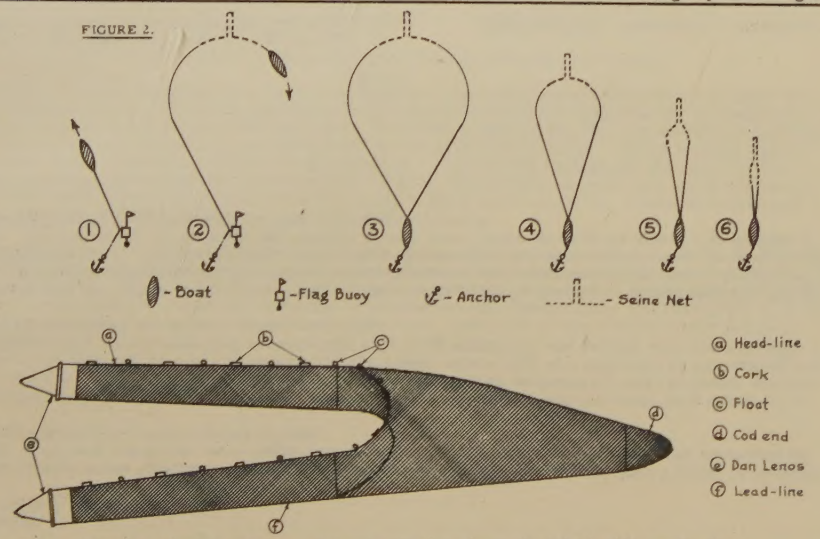


Fig. 3. The net used in Danish seining. Set out with the wings stretched wide apart, the net catches fish in a manner similar to that of the otter trawl as it is drawn along the bottom.

2.9

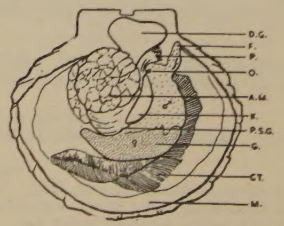
Table 1. (concluded)

Food	Cholesterol	Carbohydrate	Fatty Acids: Total saturated	Fatty Acids: Total unsaturated	Essential Fatty Acids: Linoleic	Essential Fatty Acids: Linolenic	Essential Fatty Acids: Arachidonic
	FISH						
	mg.	gm.	gm.	gm.	gm.	gm.	gm.
Cod	60.0	--	0.14	0.34	--	(--)	(--)
Flounder	72.0	--	(--)	(--)	(--)	(--)	(--)
Frog	40.0	--	0.05	0.23	(--)	(--)	(--)
Haddock	76.8	--	(--)	(--)	(--)	(--)	(--)
Halibut	72.0	--	1.15	4.74	(--)	(--)	(--)
Lobster, canned	104.0	--	(--)	(--)	(--)	(--)	(--)
Mackerel, Atlantic	96.0	--	3.60	10.08	(--)	(--)	(--)
Oysters *	784.0	13	(--)	(--)	(--)	(--)	(--)
Salmon, Pacific	72.0	--	5.96	12.85	2.16	--	4.42
Sardines, Atlantic (drained solids)	35.0	1	1.78	3.45	0.78	--	1.15
Shrimp, canned, dry pack	75.0	--	(--)	(--)	(--)	(--)	(--)
Tuna, canned, drained solids	30.0	--	(--)	(--)	(--)	(--)	(--)

(--) indicates no figure available for calculating value.
-- indicates no value.
* Includes total digitonin precipitable sterols.

2.1178 (Cross Reference: 1.84)

The dredge is thrown over the stern the right way up, and the boat travels at full speed until an amount of warp is paid out equal to approximately three times the depth of the water. The dredges are towed slowly for 2 to 2½ hours before being hauled aboard by a power-driven winch. The catch, which, in addition to scallops, contains other shellfish, starfish, sea urchins, and debris, is sorted out on deck. The scallops are placed in sacks ready to be sent to market. The average daily catch varies from 75 to 100 dozen commercial-sized scallops for a smaller class boat to 225 to 300 dozen for a larger one.



Scallop with the round shell valve removed, showing the soft part (A. M. = muscle; CT = gill; D. G. = liver; G. = roe; K = kidney; M = frill.)

2.12 BOTTOM TRAWLING EXPLORATION IN THE STRAIT OF JUAN DE FUCA FEBRUARY TO MARCH 1956

Greenwood, Melvin R. (Exploratory Fishing and Gear Development Section, U. S. Fish and Wildlife Service, Seattle, Washington)
Commercial Fisheries Review 19, 1-10 (March 1957)

In February and March 1956, the U. S. Fish and Wildlife Service's exploratory fishing vessel John N. Cobb conducted a survey in the American portion of the Strait of Juan de Fuca, from Tatoosh Island to Hein Bank, for the purpose of locating possible areas of clear bottom suitable for otter and beam trawling, and to determine the species and quantities of bottom fish available to commercial fishing methods at this time of the year.

The gear used for bottom fish was a standard 400-mesh western otter trawl with a 4½-inch mesh cod-end. For shrimp a 20-foot beam trawl fitted with bags of 36-thread 1½-inch mesh and 15-thread 1¼-inch mesh cotton webbing, 150 meshes deep was used.

Limited trawling had been carried out previously in the Straits, but this was the first attempt of a systematic coverage. Previous experience of commercial fishermen indicated that trawling in the Straits was generally hazardous, especially in the western portion, however, the exact extent of the trawlable bottom was unknown and if a productive ground were located it would be a boon to fishing vessels, especially during periods of bad weather on the off-shore fishing grounds.

The Straits span some 70 miles from end to end, and the United States side varies from 4.5 to 8 miles in width, except for the eastern part which spreads out into the Haro Strait and Admirality Inlet. The bottom cross-section profile is roughly U-shaped with the slope usually dropping off rather abruptly to 50 or 60 fathoms (100 fathoms western end) and then gradually to the greater depths. As a result nearly all the drags were made in water over 50 fathoms deep. The greatest depths of the Straits vary from about 155 fathoms in the western end to about 70 fathoms north of Green Point.

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ABSTRACTER: Harold C. Johnson

2.3 APPARATUS FOR THE RECOVERY OF CRAB MEAT. CRAB MEAT EXTRACTOR

Hiller, E. O. (Hyannis, Massachusetts)
U. S. Patents 2,771,630 and 2,771,631 (November 27, 1956)

The recovery of crab meat from the blue crab (Callinectes sapidmus) of the Atlantic coast has always been a tedious hand operation. The blue crab is a small crab with the bulk of the meat concentrated in a circular area in the body cavity. The legs are so small that the meat they contain is not worth the effort of extracting. The interior of the carcass is subdivided by a number of irregular partitions containing the body meat and viscera. Removal of the meat from the small irregular compartments by hand is relatively slow and expensive. Since the body meat is concentrated in the center of the crab with the visceral cavities around the outer edge it has been proposed that the meat-containing central portion be removed as a circular core. Earlier patents (Harris and Johnson) used a cylindrical cutting device entering the carapace from the ventral surface. In such a core the meat lies within the compartments formed by the longitudinal and lateral portions and the periphery of the core. The object of the present invention or improvement is to cut the core in a more advantageous position as well as to make the cut without rotating the core.

The core cutter consists of a cylindrical saw with teeth around the lower edge. The saw, rotated at high speed, is forced downward by a hand lever through the ventral surface and body cavity of the inverted crab. A stop nut prevents the saw from cutting through the dorsal surface of the carapace. To prevent the rotation of the cut core a "stripper disk" within the cylindrical saw presses on the carapace and prevents rotation of the core by friction between the surfaces. A spring behind the disk compresses as the cutter moves downward. When the cutter is raised the compressed spring will force the core out of the cutter, the core remaining within the carapace. Each crab is held in place by the "crab holder" which positions the carapace properly for coring. The body holding mechanism which positions the body

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ABSTRACTER: Lynne G. McKee

2.15 A MECHANICAL METHOD OF DRESSING COD ABOARD FISHING VESSELS

Anonymous (Translated from the French by Robert Duckworth)
Commercial Fisheries Review 19, 56-58 (April 1957)

Dressing cod by hand on board fishing vessels requires considerable space and ties up labor that could better be used in fishing. For these reasons, mechanization would be of considerable advantage.

The method most commonly used at sea to dress fish for shipping as fresh or salted is shown in figure 1. Two-man teams can process 20 to 25 fish a minute by this method. When the catch is heavy, the entire crew may be commandeered for this operation and thus slow up or stop the setting of the net.

The fact that the viscera of cod are attached at two points, near the head in the ventral cavity and near the anal orifice, has been used to improve the manual cutting of fish and also as the basis for a mechanical method of dressing these fish.

The mechanical device designed for cutting cod is analogous to a boring machine in which the bit has been replaced by a circular knife. There are two units; the first has a small diameter knife and cuts the fish at the anal orifice; the second has a large diameter knife and chops off the head and its connections. The viscera are then easily removed. A schematic diagram of this mechanical cutting is shown in figure 3. One of the advantages of the system is that it does not depend upon the size of the cod.

With the devices described, a four-man team can process a vessel's catch, including liver sorting.

See illustrations, over.

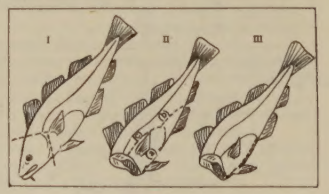

Fig. 1. - I. Removal of the head. II. Cutting for salting. III. Cutting for distribution as fresh fish.

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ABSTRACTER: Kathryn L. Osterhaug

3.249 MICROBIOLOGICAL PROBLEMS OF FROZEN FOOD PRODUCTS

Borgstrom, G.
Adv. Food Res. 6, 163-230 (1955)
Food Science Abstracts 28, 531-532 (October 1956)

Freezing destroys microorganisms to a certain extent only; temperatures in the range 0° to -10° C are the most lethal, and the lower the temperature below -10° C, the less effectively are the bacteria killed. This is believed to be due to the more extensive denaturation of protein at 0° to -10° C than at lower temperatures. Psychrophilic bacteria, however, may grow at temperatures down to -8° C. Very rapid freezing has little effect on bacteria; slow freezing is usually the most effective, but allows the growth of more bacteria before the temperatures become inhibitory.

In general, the death rate of bacteria is very small after the first few days of frozen storage; it is greater in products stored at -2° to -10° C than at lower temperatures. High counts of bacteria in frozen foods may be due to high original counts, delay before freezing, freezing too slowly or too fast, and thawing to above 0° C. Methods for making counts are described, and the results of counts on numerous frozen foods are discussed, under the headings: fruits and fruit juices, vegetables, meat, fish, whale meat, poultry, eggs, dairy products, bread doughs, and precooked frozen foods.

No cases of food poisoning attributable to precooked frozen foods have so far been reported in the United States. Pathogenic bacteria have been shown to survive in frozen foods, but Clostridium botulinum did not grow or produce toxin, perhaps because of the presence of other competing bacteria. On thawing, bacteria grow more freely than in fresh food, particularly in fruits and vegetables, because the partly softened tissues are more easily invaded; thawing at low temperatures is therefore recommended for keeping counts low, especially for precooked foods, which, unlike vegetables, may

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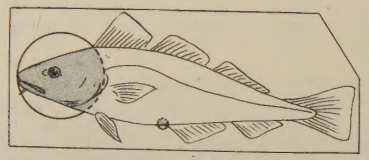

Fig. 3. - Schematic diagram showing the cutting of cod by the new method.

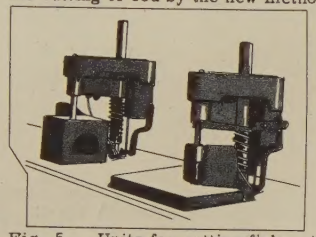

Fig. 5. - Units for cutting fish: at the right the machine for cutting the anal portion; at the left, the machine for cutting the head.

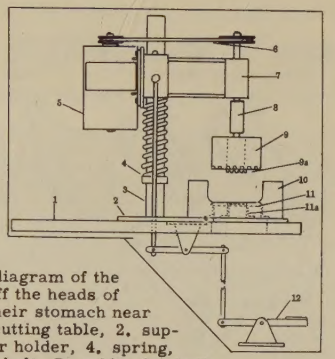

Fig. 4. - Schematic diagram of the machine for cutting off the heads of cod and that part of their stomach near the anal orifice. 1. cutting table, 2. support plate, 3. block or holder, 4. spring, 5. electric motor, 6. belt, 7. guide, 8. shaft, 9. & 9a. removable circular knives for cutting the head or stomach around the anal orifice, 10. support plate for fish, 11. & 11a. fixed knives, 12. pedal.

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North of Dungeness Spit the water again deepens to about 95 fathoms.

Although a number of likely looking trawling areas were located on navigational charts, subsequent examination with the aid of a recording depth sounder revealed the majority to be unsuitable for otter-trawl gear. Even after careful analysis of charts and depth recording records, out of 38 otter-trawl drags only 12 came through absolutely clear. Bottom samples taken in connection with the fishing operation revealed a considerable variation of types, even within relatively contained areas.

Out of 16 drags made west of Twin only one came through uninjured, however, five drags made from Slip Point to Piller Point suffered only minor damage. East of Twin, 4 out of 22 drags resulted in severe damage to the net, 7 with slight tears, and 11 came through clear. From a commercial fisheries viewpoint the fishing results were poor, although several species of fish having commercial value were taken throughout the area, fish such as ratfish, dogfish, skates, and turbot dominated the otter-trawl catches.

A total of 23 beam-trawl drags made at depths of 49 to 118 fathoms from Kydoka Point to Hein Bank indicate that much of the bottom in this area is satisfactory for this type of gear, for only two drags obtained severe net damage. Some shrimp were found but not in concentrations of commercial value.

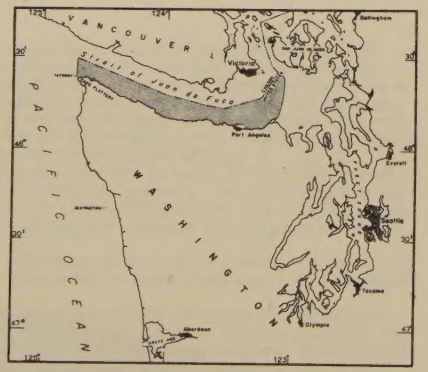

Fig. 1. - Northern coast of Washington, shaded area in the Strait of Juan de Fuca was explored by the John N. Cobb.

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not be thoroughly heated before they are eaten. Indicators have been invented to show whether a frozen food has been thawed, and, if so, for how long. Most spoilage of frozen foods is due to improper handling before freezing or after thawing; freezing and storage conditions are of secondary importance.

3.2

of the crab beneath the cutter, together with the mechanism for ejecting the cored carapace and core, forms a unit of which there are several mounted around the circumference of a turntable. The turntable is indexed. When the crab beneath the coring device is cored, the turntable may be hand or automatically advanced to the next position. This movement brings an uncored crab into position beneath the core cutter and advances the cored crab to the core and carapace ejection station. The ejected core may then be placed by hand into the "Crab Meat Extractor". The extractor consists of a split cup mounted on an upright shaft. The core is placed by hand into the open cup and the two halves of the cup closed to hold the core firmly. When this cup is spun at high speed the meat within the core will be ejected through openings in the side of the cup. The cup is mounted within a housing having tensioned rubber sides to catch and direct the ejected meat into a suitable container. The extractor under the above patent has the advantages of automatically opening for extraction of the empty core and insertion of the new core while the cup is stationary. Rapid acceleration and deceleration of the cup is automatic with the cup coming to a stop properly oriented for reloading.

3.12 COMPLEMENTARY ACTION OF ANTIBIOTICS AND IRRADIATION IN THE PRESERVATION OF FRESH MEATS

Niven, C. F., Jr. and Chesbro, W. R. (American Meat Institute Foundation, Chicago, Illinois)
Antibiotics Annual 1956-1957, pp. 855-857 (1957) Medical Encyclopedia, Inc., New York, N. Y.

Table 4
Retardation of Mycotic and Bacterial Growth in Beef at 2° C. Achieved by Combinations of Gamma Irradiation (10^5 rep), Oxytetracycline (10 ppm), and Sorbic Acid (0.1 percent)

Treatment	Days for ten-fold population increase	
	Yeasts and molds	Bacteria
1. None	>20	2-5.5
2. Irradiation	3.5-9.0	4-6
3. Oxytetracycline	3	7-8
4. Sorbic Acid	>20	3-5
5. Irradiation plus oxytetracycline	4	14
6. Irradiation plus sorbic acid	8-17	8-17
7. Irradiation plus sorbic acid plus oxytetracycline	15-23	16-33

Combinations of the tetracycline antibiotics, high energy radiation, and sorbic acid have been found effective in delaying microbial spoilage of prepackaged fresh meats. However, other factors must also be taken into consideration before these treatments can be put into practical use. The color of meat is difficult to retain even when microbial growth is controlled.

Taste panel studies indicated that a gradual reduction in acceptability occurred during storage at

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ABSTRACTER: Kathryn L. Osterhaug

3.239 THE EXPRESSIBLE FLUID OF FISH FILLETS

Love, R. M. (Torry Research Station, Aberdeen, Scotland)
Journal of the Science of Food and Agriculture 8, 238-242 (April 1957)

Cell damage was measured in cod fillets frozen from one side at different speeds by the escape of deoxypentose nucleic acid (DNA) into intercellular spaces.

The cod (Gadus callarius) was iced prior to freezing for 1 to 6 days, during which time the DNA in the expressible fluid does not alter appreciably. Before each experiment the fish were filleted and trimmed.

Freezing was undertaken in an open wooden box divided into four equal compartments. The floor consisted of a single sheet of aluminum separated from the wood by a rubber gasket. Aluminum foil was placed on the floor of each compartment and a fillet with skin intact was placed on it with the cut surface downwards. Four stacks of fillets, 8 or 9 deep, were produced; each contained a thermocouple and was separated from other fillets by aluminum foil. The top of the box was insulated by layers of "Cellosene" cellulose wadding.

The thermocouples were connected to a direct-reading potentiometer and the whole box suspended over a large insulated tank cooled to -78° C. by an ethanol-carbon dioxide bath. The aluminum bottom of the box was just submerged and temperature readings were taken every minute for the first half hour, every five minutes for the following hour, and a half, and subsequently every ten minutes until the temperature of the top layer reached -5° C.

Eight experiments were carried out and DNA phosphorus-freezing time curves are presented. Variations in the positions of the maxima were found to be quite small. The main regions of damage

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ABSTRACTER: Donald C. Malins

3.12 ANTIBIOTIC RESIDUES IN FISH ICED WITH CHLORTETRACYCLINE ICE AND EFFECT OF NORMAL COOKING PROCEDURES ON THESE RESIDUES

Boyd, J. W.; Southcott, B. A.; and Tarr, H. L. A. (Fisheries Technological Station, Vancouver, British Columbia, Canada)
Antibiotics Annual 1956-1957, pp. 1002-1005 (1957) Medical Encyclopedia, Inc., New York, N. Y.

When chlortetracycline (CTC) is treated with alkali, or when flesh foods containing it are heated, it is changed to isochlortetracycline which is essentially inert bacteriostatically. However, because fish muscle and other natural colloids may retard this change, some consideration must be given to the problem of CTC residues in cooked flesh foods.

Previous work has shown that only very small residual amounts of CTC can be found in exposed portions of gray cod (Gadus macrocephalus) stored in ice containing CTC for about 10 days. In the study reported here, CTC residues in fresh gray cod iced with CTC ices containing 2 and 4 μ grams per gram of the antibiotic, and the effect of normal cooking procedures on these residues have been determined. Data are also reported for CTC residues in the flesh and liver of treated whales.

Experimental. -- In the first experiment, fresh round gray cod were stored in ordinary ice and in crushed block ice containing 2 and 4 μ gram per gram of CTC. At stated intervals, fish were removed, filleted, and cooked by being immersed for 10 minutes in boiling water, baked for 10 minutes in a 475° F. oven, or fried about 5 minutes in cottonseed oil. Extracts were made of both the raw and the cooked fish and assayed for CTC by a pad plate microbiologic method. See table 1 (see over).

In the second experiment, gray cod were selected at random from fishing vessels that had alternately carried ordinary ice and ice containing 2.5 μ grams per gram of CTC. These fish were cooked by methods similar to those used in the first experiment, extracted and assayed for CTC.

Results. -- The results of both experiments indicate that boiling removes all assayable CTC in skinned fillets and usually most of that present in unskinned fillets. Small and variable concentrations of CTC occurred in unskinned and skinned fillets that had been baked or had been fried in mineral oil.

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ABSTRACTER: Kathryn L. Osterhaug

3.13 SANITATION - FISHING BOATS

Mader, K.
Fette, Seifen Anstrichmittel 58, 429 (June 1956) (In German)
World Fisheries Abstracts 8, 19-20 (March-April 1957)

Ozone, being atmospheric oxygen "activated" in an electric field, is used as a deodorizing or a bactericidal agent because of its oxidative properties. In deodorizing, ozone oxidizes the off-odors in the air, which are mostly of organic origin, or makes them less perceptible by a blending with its own specific odor. For deodorizing, only small quantities of ozone are needed. For bactericidal action, larger concentrations are necessary but these need not be applied continuously; in a cold store room, ozone should be used in doses of short duration at 4 to 5-hr. intervals. Ozone should, however, NOT be applied directly to fish.

In the processing of fish, the multiplication of microorganisms can be reduced by exposing the fish to air which has been treated with ozone and by washing in ozone-sterilized water. It is suggested that immediately after the catch, all fish should be washed in water sterilized by ozone and that the same should be used for the cleansing of all apparatus with which the freshly caught fish come into contact. Fish exposed in retail shops should keep fresh longer if continuously fanned with slightly ozonized air. This would, at the same time, remove off-odors. No special technical difficulties are expected to introduce ozonizing apparatus aboard fishing vessels as such equipment has been used for many years on freight and passenger ships. An ozone-producing installation, specially adapted for use on board is described. In a square metal box with a lid, there are 4 discs in which a high tension electric field is generated. Under the box, a ventilator is placed for carrying the ozone-air mixture through the desired air ducts. The electric discharges producing the ozone can be observed through 4 small windows in the lid of the box. The ozonizer should be fed with preferably cold air at a low moisture content. A diagram for the mounting of the apparatus aboard ship is presented (omitted).

ABSTRACTER: C. J. H. van den Broek

ANTIBIOTICS PLUS IRRADIATION

ANTIBIOTIC RESIDUE

CELL DAMAGE FROM FREEZING

OZONE IN FISH PROCESSING

3.12

Table 1
CTC Residues in Flesh of Gray Cod Iced with CTC Ice and Effect of Cooking on These Residues

Days stored in ice	Concentration CTC in ice, μg. /Gm.	Residual CTC in fresh gray cod fillets after cooking, μg. /Gm.					
		Uncooked		Baked		Boiled	
		Skinned	Unskinned	Skinned	Unskinned	Skinned	Unskinned
3	0	0	0.02	0	0.02		0
	2.0	0.03			0		0
	4.0	0.06	0.15		0.08		0
5	0	0.07		0.07			0.05
	2.0	0.10	0.18	0.07	0.07	0	0.03
	4.0	0.10	0.23	0.05	0.13	0	0.02
7	0		0		0	0	
	2.0	0	0.06	0	0.03	0	
	4.0	0	0.20	0	0.05	0	0.03
10	0		0		0		0
	2.0		0.31		0.08		0.06
	4.0		0.60		0.38		0.30

3.13

3.12

2° C. that could not be correlated either with bacterial or mycotic population levels, or with any of the treatments used.

Another limiting factor is the occurrence of so-called "drip-loss" from the meat during prolonged storage. Because of these limitations, it is probable that when bacteriological data are considered alone, an overly optimistic picture is presented.

Table 1
Effect of Gamma Radiation (100,000 rep) Alone or in Combination with Oxytetracycline (10 ppm), on the Quantitative Bacterial Flora of Beef Round Held at 2° C.

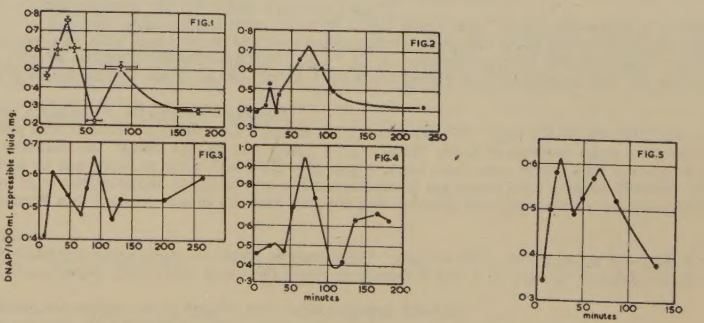
Treatment	Bacteria per Gm. (x 10^3)			
	0 days	8 days	14 days	20 days
Control	90	700,000	4,000,000	800,000
Irradiation	0.5	100	60,000	2,000
Irradiation plus oxytetracycline	0.5	1	60	

Table 2
Effect of Gamma Radiation (100,000 rep) and Oxytetracycline (10 ppm) on Subsequent Growth of Yeasts and Molds in Ground Beef at 2° C.

Treatment	Yeasts and molds per Gm. (x 10^3)	
	0 days	12 days
1. Control	40	75
2. Irradiation	6	850
3. Antibiotic	40	100,000
4. Irradiation plus antibiotic	6	10,000

3.239

were close to 25 minutes and 70 to 85 minutes. The DNAP-freezing time curves indicate that the fillets do not undergo the damage of ultrarapid freezing rates characteristic of fillets frozen from both sides.



Figs. 1 to 5. --Deoxypentose nucleic acid phosphorus in the expressible fluid from cod fillets frozen at different rates.
(Freezing time is the time for the thickest part of the fillets to cool from 0° to -5°)

3.338 IRON SULFIDE DISCOLORATION OF TUNA CANS NO. 6 -- EXPERIMENT TO ELUCIDATE MECHANISM OF THE REACTION

Pigott, George M. and Stansby, M. E. (Fishery Technological Laboratory, Seattle, Washington)
Commercial Fisheries Review 19, 1-5 (April 1957)

This is the final article of a series based on work sponsored cooperatively by the Continental Can Company and the United States Fish and Wildlife Service. The five preceding papers have dealt with the effect of processing variables on can discoloration. The work reported here was designed to elucidate the mechanism of the reaction that causes the iron sulfide discoloration.

Experimental. --Previous work has shown that iron sulfide discoloration is formed from the hydrogen sulfide produced by the tuna meat during retorting, and iron in the tin can that has been converted to the ferrous state. The solution to the problem now appears to lie in determining the mechanism whereby iron is converted to the ferrous form by a substance that is apparently present only in certain batches of tuna. A series of experiments was carried out to study the mechanism of this reaction.

Tuna that had previously caused discoloration was repacked in an effort to find out if the factor causing it was in the meat or in the liquid. The tuna that had caused discoloration in the original packs again caused discoloration when repacked into new cans. The oil drained from the original discolored packs did not cause discoloration in freshly packed albacore that had never caused can discoloration. Thus, the factor favoring discoloration seems to be present in the tuna meat.

Headspace gases in various experimental and commercial solid packs of tuna were analyzed for volatile acids, volatile bases, oxygen, and hydrogen to see if a difference in composition between normal and discolored tuna could be detected. No significant differences were detected between the various packs.

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ABSTRACTER: Kathryn L. Osterhaug

6.10 LIKELY FUTURE PRICE OF FISH MEAL DISCUSSED AT FISHERIES MEETING

Anonymous
Feedstuffs 29, 6 (May 25, 1957)

"The price of fish meal in 1967" was Dr. H. R. Bird's topic at the recent annual convention of the National Fisheries Institute in Chicago. Dr. Bird is chairman of the Poultry Husbandry Department at the University of Wisconsin, Madison. He believes that fish meal will command a premium price for many years to come because of its high quality protein as well as its growth factors and vitamin content.

Nutrient value. -- On the basis of the dollar and cents values of the energy and protein in corn and soybean meal and the vitamins and minerals in a poultry feed or a feed ingredient, the nutrients supplied by 100 pounds of fish meal have a value of $5.12. In the Midwest, however, fish meal is selling for $6.81 per 100 pounds, or at a premium of $1.69 for the intangibles which include an unknown growth factor and high quality protein. With the discovery of other sources, the monetary value of the unknown factor in 100 pounds of meal may decrease to 24 cents or the present value of vitamin B_{12} or even to 1 cent, the present value of riboflavin. At this point in time, the value of fish meal will become more dependent upon its important amino acids. Corn and soybean meals are low in methionine and cystine, the sulfur-bearing amino acids; therefore, diets based on these meals need to be supplemented with synthetic DL-methionine at $2.65 per pound or in part by replacing some of the soybean protein with fish meal, which contains methionine. The methionine in fish meal in excess of that ordinarily found in a corn-soybean meal diet acquires the same value as synthetic methionine. Assays of corn-soybean meal diets and fish meal showed that 100 pounds of fish meal contains 0.396 pounds of extra methionine plus cystine. This extra methionine at $2.65 per pound is

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ABSTRACTER: Martin Heerdt

3.5 SALTING, METHODS AND EQUIPMENT -- DRY SALTING

Anonymous
Deutsche Fisherei Zeitung 3, No. 1, p. 27 (January 1956) (Dresden, E. Germany)
World Fisheries Abstracts 8, 35-36 (January-February 1957)

A new mechanical system, developed by A. K. Bodjandin of the Russian fish processing plant "Krim-Gosribtresta" is described. It has a weight of 750 kg. (1,653 lb.) only and needs little space. It is easily portable and, on a tugboat, can be brought near to the ship to be discharged. The equipment works in the following way: the fish pump delivers the fish, together with water, into a funnel-shaped distributor and on to a net-like conveyor belt from which the water runs back to sea. The fish are transported to a bin installed on an automatic balance. Having attained a certain weight, the batch of fish is carried from the weighing bin into the processing bin. Here, the adequate quantity of salts is added to the raw material over a conveyor belt mounted at the side. The mixture of salt and fish is delivered to the barrels by means of 2 short chutes. The barrels, filled with fish, are forwarded by hand over a roller belt. After the fish have settled, the barrels get a certificate of quality and are sealed. By this method, which can be modified for different species, the fish are treated very carefully. Using the common method of salting fish, there was a loss of salt of 25 to 35%; when applying this system the loss amounted to 16 to 20% only. In comparison with the present method of salting by hand, production was increased in the same working time by 400% by this system.

ABSTRACTER: W. Partmann

6.193 EFFECT OF DIFFERENT DIETS AND UNIDENTIFIED FACTOR SUPPLEMENTS ON REPRODUCTION IN CHICKENS AND EARLY CHICKEN GROWTH

Jensen, Leo S. and McGinnis, James (State College of Washington, Pullman)
Poultry Science 36, 312-319 (March 1957)

A study was made to compare the effect of practical and semi-purified diets on reproduction in hens and on the early growth of chicks from hens maintained on these diets.

Experimental plan. --Seven-month-old, single-comb white leghorn pullets were distributed among twenty-four 4-foot by 8-foot wire-floored laying cages at the rate of 20 pullets to each cage. Three white leghorn cockerels were placed in each cage. Egg production, pullet mortality, average egg weight, fertility, and hatchability were recorded throughout each of 6 consecutive 28-day experimental periods. Eggs obtained during 5 consecutive days out of each 28-day period were used to determine average egg weight and then were incubated.

Experimental diets. -- Diet 1, a corn (68.2 percent)-soybean meal (20 percent) practical basal diet was fed only to hens. Diet 2, a herring meal (22.0 percent)-sucrose (67.67 percent) semi-purified diet was fed only to hens. Diet 3, a herring meal (29.0 percent)-sucrose (64.16 percent) diet was fed only to chicks, the progeny of hens maintained on the practical diet and to chicks the progeny of hens maintained on the semi-purified diet. Diets 1, 2, and 3 were fed both unsupplemented and supplemented with various unidentified growth factor materials. These materials were fish solubles at a 3 percent level in the diet, forage juice at a 3 percent level in the diet, and distillers dried solubles at a 3 percent level in the diet. Diets 1 and 2, which were fed to hens, were supplied unsupplemented or supplemented with one of the following: fish solubles; fish solubles and forage juice; forage juice and distillers dried solubles; and fish solubles, forage juice, and distillers dried solubles. Three cages of hens received each of the diets. In Diet 1, the protein level was adjusted when supplements were added to maintain a constant protein level, whereas in Diet 2 the supplements

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ABSTRACTER: Martin Heerdt

DISCOLORATION OF TUNA CANS

MECHANIZED FISH SALTING

DOLLAR VALUE OF FISH MEAL

EFFECT OF GROWTH FACTORS

3.5

3.338

The pH of the tuna was found not to be an important factor in determining the extent of can discoloration.

Discoloration reported in commercial packs occurs in solid-pack tuna but not in flake packs. The main differences between solid pack and flake pack tuna are the particle size and the amount of free liquid in the can. The flake pack absorbs much more oil than the solid pack so that the commercially canned flake tuna has no free oil in the can. Because of these facts, the effect of having free oil or brine in flake packs was thoroughly investigated using albacore and yellowfin tuna that normally caused can discoloration in solid packs. It was found that discoloration did not occur in canned tuna unless free liquid (oil or brine) was present in the cans. These experiments again demonstrated that salt must be present if discoloration is to take place.

It has been observed that iron sulfide discoloration never occurs where meat or liquid is in contact with the can during the cooling period after retorting. Tin sulfide often forms in this area in both normal and discolored packs. Cans of tuna that were inverted between 5 and 20 minutes after retorting showed no discoloration on either the top or bottom. In the few tuna canneries where the cans are placed in orderly fashion on trays and retorted these trays could be readily inverted after removal from the retort. However, in most tuna canneries the cans are placed in baskets in a jumbled fashion and could not be inverted in order to prevent discoloration.

6.193

were added simply at the expense of sucrose.

The authors, by using a practical diet (Diet 1) from plant sources and devoid of crude materials, hoped to obtain in hens and the progeny of these hens a dietary deficiency for certain unidentified growth factors. The semi-purified diets were based on a chick diet developed by Jensen (1954) for a study of unidentified factors in forage juice.

Chick study. -- To determine the effect of the maternal diet on the growth rate of the progeny, the authors conducted two studies with chicks from hens maintained on Diets 1 and 2. For study A, unsexed chicks (48) from hens that had been on the diets for 2 months (except 36 chicks for the purified diet plus distillers dried solubles) were randomly placed in electrically-heated, wire-floored battery brooders, fed a commercial chick starter, and weighed initially and at the end of four weeks. For Study B, chicks in lots of 16 females and 16 males from hens that had been on each of the maternal diets unsupplemented and supplemented for 4 months were fed Diet 3 unsupplemented and supplemented with 3 percent distillers dried solubles and 3 percent forage juice. Study B chicks were randomly placed, housed, and weighed the same as Study A chicks.

Results with hens. --Diet 1 supplemented with fish solubles, forage juice, distillers dried solubles, or combinations of these unidentified factor materials and Diet 2 supplemented with forage juice or distillers dried solubles or a combination of these two materials, did not affect egg production, egg weight, or the hatchability of fertile eggs. Diet 1,unsupplemented and supplemented, yielded greater egg production and larger eggs than Diet 2, unsupplemented and supplemented, Hatchability of eggs from hens on Diet 1, unsupplemented and supplemented, was no different than the hatchability of eggs from hens on Diet 2, unsupplemented and supplemented.

Results with chicks. -- Carry-over studies with chicks that were the progeny of hens on depletion diets failed to show any depletion effect for the unidentified growth factor materials included in this study. Regardless of the chick diet fed, chicks that were the progeny of hens fed Diet 1, unsupplemented and supplemented, showed a higher rate of growth than chicks that were the progeny of hens fed Diet 2, unsupplemented and supplemented.

6.10

worth $1.05. If the extra methionine value of fish meal is added to the current nutrient value of corn-soybean meal, which is $5.12, the total value of fish meal reaches $6.17. This leaves a negative balance of 64 cents to cover the value of the other critical amino acids and the unidentified growth factor(s) in fish meal.

In addition to methionine, fish meal is a good source of some of the other critical amino acids. As the synthetic forms of the other amino acids become available at prices which will permit their use in commercial feeds, they will establish the value of the other extras present in fish meal. On this basis, it appears that fish meal will continue to command a premium price.

4.12 FATTY OILS OF AQUATIC INVERTEBRATES. IX. PROPERTIES OF FATTY OILS FROM 13 KINDS OF JAPANESE SHELLFISH

Toyama, Yoshiyuki; Tanaka, Tatsuo; and Maeda, Takeo
Mem. Fac. Eng., Nagoya Univ. 7, 145-50 (1955)
Chemical Abstracts 51, 4737 (March 25, 1957)

The oils of 13 kinds of Japanese shellfish were examined. The viscera gives a higher yield of ether ext. than the flesh. The acetone-soln. portion of the ether-ext. of the viscera is generally higher than that of the flesh. The I no. is higher and percentage of unsaponifiable is lower in the visceral oil than in the flesh oil. The unsaponifiable matter of visceral oil contains a smaller proportion of sterol than that of flesh oil, whereas the provitamin D is the reverse in the 2 oils. Among the oils from the gastropods, the oils from Turbo cornutus, Lunella coronata coreensis, and Monodonta labio contain cholesterol as the chief component of sterols. Sterol from Hemifusus ternatanus seems to contain a considerable amt. of F_2-sterol together with cholesterol. Sterol from Tonna luteostoma is characterized by its very low m.p. Provitamin C in this sterol was concd. up to 21.8% by recrystn. of its acetate. Sterols from the Bivalvia seem to consist substantially of F_2-sterol rather than F_1-sterol. Polyethenoid acids of the fatty acids from L. coronata coreensis (I), M. labio (II) and Chlamys farreri nipponensis (III) were examd. by ultraviolet absorption measurement of alkali-isomerized fatty acids, and it was found that the fatty acids from II and III contain larger mats. of pentaene than triene, whereas the reverse is true for I.

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6.193 CORN DISTILLERS DRIED SOLUBLES AS A GROWTH-PROMOTING AND PIGMENTING INGREDIENT IN BROILER FINISHING PROTEINS

Runnels, T. D. (University of Delaware)
Proceedings Distillers Feed Conference 12, 54-60 (March 13, 1957)

Purpose. -- This study was made to determine the most effective level of corn distillers dried solubles when added individually or in combination with 2.5 percent menhaden fish meal to basal diets that contained 1000 and 1100 calories of productive energy per pound.

Experimental. -- Day-old commercially hatched Ventress cross Nichols No. 12 chicks were distributed in 16 floored pens with 25 males and 25 females in each pen. All chicks were fed a starting diet for their first 4 weeks and a finishing diet thereafter until termination of the study at 9 weeks. The finishing diets were formulated by adding supplemental ingredients to the basal finishing diet. These diets were calculated to be iso-nitrogenous and iso-caloric with the same level of methionine within each series in order to remove these factors as variables.

Results. --All data collected are summarized in tabular form (see over). Average weights were determined from an equal number of male and female broilers weighed individually. Feed efficiency was based upon total consumption of both starting and finishing diets. The addition of corn distillers dried solubles to the finishing diet at levels of 0, 2.5, 5.0, and 7.5 percent of the diet significantly improved average broiler weight at 9 weeks of age. The growth response attributable to the fish meal, although not significant, appeared to be additive to the response from corn-distillers dried solubles. Feed efficiency improved slightly with each increasing level of corn distillers dried solubles and fish meal, but these differences were not statistically significant. Chicks fed the 1100-calorie diets required 2508 calories to produce a pound of live weight, whereas chicks fed the 1000-calorie diet required only 2440 calories.

See table, over.

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 ABSTRACTER: Martin Heerdt

6.193 EFFECT OF CALCIUM LEVEL AND TRACE MINERALS ON THE RESPONSE OF YOUNG PIGS TO UNIDENTIFIED GROWTH FACTORS

Beeson, W. M.; and Conrad, J. H. (Purdue University, Lafayette, Indiana)
Proceedings Distillers Feed Conference 12, 48-53 (March 13, 1957)

Purpose. --Five feeding experiments were conducted with 21-day old pigs. The objectives of these experiments were: (1) to formulate and test feed a semi-purified diet suitable for studying various sources of unidentified growth factors, (2) to study various levels of minerals as they affect the response to unidentified growth factors, and (3) to study the effect of various crude and pure sources of unidentified growth factors on the growth of the young pig.

Experimental. -- Early weaned pigs, 21 days old, and weighing about 10 pounds each initially, were grouped into lots of 2 to 6 pigs each and fed a casein basal ration containing 1.06 percent calcium with glucose (cerelose) as the only source of carbohydrate, or a semi-purified ration for 6 to 10 weeks. The percentages of ingredients in the semi-purified ration were as follows: isolated soybean protein 25.0, glucose (cerelose) 31.38, cornstarch 31.37, corn oil (mazola) 5.0, celluflour 3.0, DL methionine 0.25, mineral mixture 4.0, plus a trace mineral mixture, vitamin mixture, and chlortetracycline HCl (25 milligrams per pound). Modifications were made in the semi-purified ration in keeping with the purposes of the five different experiments.

In experiment 1, growth response on a casein basal ration was compared with that on the semi-purified ration with and without extra vitamins, trace minerals, and five sources of unidentified growth factors. In experiment 2, with Duroc pigs and 3, with Chester White pigs, growth on a semi-purified ration was compared with that on the same ration with extra trace minerals and each of 5 different sources of unidentified growth factors added singly. Experiment 4 was of factorial design and intended to compare growth on a high calcium (1.06 percent) semi-purified basal ration with that on a low calcium (0.68 percent) semi-purified basal ration. Zinc, brewers' dried yeast, corn distillers dried

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 ABSTRACTER: Martin Heerdt

6.193 CORN DISTILLERS DRIED SOLUBLES IN TURKEY FEEDS -- SUMMARY OF NEW DEVELOPMENTS. PART II. - TURKEY HATCHABILITY

Couch, J. R.; Kurnick, A. A.; Svacha, R. L.; and Reid, B. L. (Texas A and M College System, College Station)
Proceedings Distillers Feed Conference 12, 75-76 (March 13, 1957)

Introduction. -- The value of distillers dried solubles as a feed additive to turkey breeder diets was first reported upon by Couch et al. in 1954. This report showed that hatchability remains at a reasonably satisfactory level during the first 8 to 10 weeks of the laying season even if the breeders are maintained on an all-vegetable protein diet. As the laying season progressed beyond 8 to 10 weeks, however, hatchability of fertile eggs decreased and embryonic mortality increased. Even when 5 percent fish meal and 5 percent distillers dried solubles were added to an all-vegetable protein diet, hatchability could not be maintained over an 18-week period. The possibility exists, however, that the fish meal and the distillers dried solubles incorporated in the vegetable protein diet were somewhat deficient in unidentified factor content.

Results of this study. -- Atkinson et al. (1955) made a second study of this problem. His results appear in tabular form on the back of this card. These data show that the addition of 5 percent distillers dried solubles to a breeder diet containing dehydrated alfalfa meal increased hatchability by about 10 percent throughout the 12th to the 17th week of the laying season. In attempting to classify unidentified growth factor sources into groups, some research workers have reported that distillers dried solubles contained the fish factor. The presence of unidentified growth factors may account for the increase in hatchability that results when distillers dried solubles, or fermentation solubles factor as they are sometimes called, are added to the turkey breeder diet during the latter part of the hatching season.

See table, over.

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 ABSTRACTER: Martin Heerdt

PROPERTIES OF OILS FROM SHELLFISH

FISH SOLUBLES PLUS CALCIUM

FISH MEAL IN BROILER RATIONS

SOLUBLES FOR HATCHABILITY

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solubles, dried whey product, and menhaden fish solubles, each were added singly as supplements to both the high and the low-calcium semi-purified basal rations. In Experiment 5, pig growth on a low-calcium (0.68 percent) semi-purified basal ration was compared with that on the same ration supplemented with one of each of the following: pepsin, adenosine, mevalonic acid, bromine, or brewers' dried yeast.

Results. -- Maximum growth response from the addition of unidentified growth factor sources to semi-purified rations for pigs was obtained with a 1.06 percent calcium ration. High levels of calcium (1.06 percent) appeared to act as a stress factor as well as a predisposing factor in the production of parakeratosis.

Zinc, brewers' dried yeast, corn-distillers dried solubles, dried whole whey and fish solubles (Lassen process) as supplements to semi-purified rations increased gains from 6 to 16 percent if the ration contained 0.68 percent calcium and from 17 to 45 percent if the ration contained 1.06 percent calcium.

Zinc and factors other than zinc, such as are contributed by various sources of unidentified growth factors, prevented or greatly reduced the incidence of parakeratosis, and in so doing increased the rate of growth. The semi-purified 0.68 percent calcium ration with 72 parts per million of zinc produced good gains and was not improved by the addition of pepsin, adenosine, divalonic acid, bromine, or brewers' dried yeast. Data obtained from these studies shows that a part of the variability obtained from feeding various sources of unidentified growth factors to pigs is due to an imbalance in known minerals such as calcium and zinc.

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Effect of alfalfa, fish solubles, dried whey, and distillers dried solubles on fertility, hatchability and tocopherol content of yolks of broad breasted bronze turkey eggs (Atkinson, et. al., P. Sci. 34: 730-735, 1955)

Supplements to Basal diet[1]	Weeks 0-11 Fert.	Weeks 0-11 Hatch.	Weeks 12-17 Fert.	Weeks 12-17 Hatch.	Toc./egg yolk[2]
	%	%	%	%	mcg
None	79.4	83.7	48.6	31.0	590
5% DAM	72.5	80.3	83.6	54.3	670
5% DAM + 5% CFS	74.3	76.0	90.9	81.0	486
5% DAM + 3% DW	82.6	82.1	69.5	58.4	676
5% DAM + 3% DW + 5% CFS	47.5	80.1	44.0	64.5	349
5% DAM + 5% DDS	76.7	85.9	68.8	64.0	1,073
5% DAM + 5% DDS + 5% CFS	87.6	83.0	83.5	76.5	781
5% DAM + 5% CFS + 3% DW + 5% DDS	81.6	82.4	79.2	75.0	699

[1]DAM = Dehydrated alfalfa meal; CFS = Condensed fish solubles; DW = Dried whey; DDS = Distillers Dried Solubles.
[2]Tocopherol content of egg yolks collected at the end of the seventeenth week.

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Average body weight, feed efficiency, and pigment score of broilers fed experimental diets

Treatment no.	Treatment	9 weeks of age: Pen no.	Body wt.	Feed/lb. live wt.	Pigment score
			lb.	lb.	
1	0	5	3.10	2.45	9.0
2	0 + D2.5	1	3.13	2.45	16.2
3	0 + D5.0	14	3.14	2.45	15.1
4	0 + D7.5	15	3.15	2.44	12.8
5	0 + F2.5	12	3.12	2.47	10.8
6	0 + D2.5 + F2.5	16	3.15	2.44	13.4
7	0 + D5.0 + F2.5	8	3.22	2.41	12.9
8	0 + D7.5 + F2.5	4	3.17	2.39	12.9
9	0 + E	10	3.11	2.31	6.5
10	0 + D2.5 + E	13	3.15	2.30	12.4
11	0 + D5.0 + E	3	3.16	2.27	11.0
12	0 + D7.5 + E	7	3.22	2.25	10.8
13	0 + F2.5 + E	6	3.12	2.28	8.5
14	0 + D2.5 + F2.5 + E	2	3.16	2.29	13.1
15	0 + D5.0 + F2.5 + E	9	3.21	2.25	8.7
16	0 + D7.5 + F2.5 + E	11	3.16	2.26	7.3

O - Corn-soybean oil meal basal.
D - Corn Distillers Dried Solubles.
F - Menhaden fish meal.
E - Animal fat added to increase the productive energy content of the diet from 1000 to 1100 Cal. of productive energy per lb.

4.92 NUTRITIVE VALUE OR TOXICITY OF HIGHLY UNSATURATED FATTY ACIDS

Kaneda, T.; Ishii, S.; and Sakai, H.
J. Biochem., Tokyo 41, 327-335 (1954) 42, 561-573 (1955)
Food Science Abstracts 29, 57 (February 1957)

I. Ethyl esters of highly unsaturated fatty acids (average iodine number 335.92), obtained from sardine oil, when forcibly fed to rats at a concentration of 5% in the diet, gave approximately the same growth rate as an olive oil supplement. When the hydrogenated esters (average iodine number 161.08) were used, the growth rate decreased.

II. The nature of the autoxidized material formed from the ethyl esters of the liquid fatty acids of linseed oil on exposure to atmospheric oxygen, and found previously to have a toxic effect on rats, was investigated. The constituents of the autoxidized material were separated by urea complex fractionation, and the effects on rats of each of 3 fractions obtained were determined. The toxic effects were found to be mainly attributable to the formation of peroxides, products freed from peroxides being non-toxic. A large quantity of peroxides was found in the liver and muscle fats of rats fed the autoxidized unsaturated fatty acids; when fat with a high peroxide content was fed, the peroxide value of the tissue fats increased. Since the number of rat liver mitochondria decreased when autoxidized fatty acids were added to the mitochondria in vitro, it is concluded that the toxicity of peroxide in autoxidized unsaturated fatty acids is due to injury to the tissues of the rats.

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7.642 • ASSAYS OF UNIDENTIFIED CHICK GROWTH FACTORS

Anonymous
Nutrition Reviews 15, 82-84 (March 1957)

Improved assay procedures are needed to obtain significant and consistent differences in chick growth when unidentified organic chick growth factors are included in the diet of chicks. These factors exist in a variety of crude products.

Difficulties encountered. --In 1953, Barnett and Bird found that the responses of chicks to sources of unidentified growth factors as supplements to highly purified diets were no longer obtainable in their laboratory. The cessation in growth response occurred after an extended period of good growth response. To apply various types of stress to the birds, the workers fed testosterone, thyroprotein, and cortisone, or changed the protein level of the diet. However, they did not succeed in their attempt to regain the growth response under stress.

Solution to problem. --Eventually these workers found that growth could be depressed if the diets of the chicks were contaminated with 1 percent of feces from older birds raised on litter. If fish solubles were fed as a source of unidentified factors under these conditions, growth differences resulted that were consistently better than differences obtained in the uncontaminated groups. After several such experiments, the room in which the batteries of chicks were housed appeared to have become contaminated. Thereafter, growth responses were obtained from added fish solubles without the addition of feces to the diet.

Interpretation. -- To interpret their findings, Barnett and Bird depended upon a report by Hill and Kelly (1954) which suggested a relationship between the intestinal flora of the chick and its response

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ABSTRACTER: Martin Heerdt

6.195 BODY COMPOSITION AND PROTEIN NUTRITION

Combs, G. F.
Poultry Comment 14, 4 (Spring 1957)

Differences in diets have resulted in marked differences in body composition of growing chicks. Chickens fed a ration with a calorie to protein (C/P) ratio of 49 had 26.8 percent fat on a dry basis compared with 16.1 percent for similar chicks fed a ration with C/P ratio of 25. The chicks increased their feed consumption as the energy content of rations decreased. Other studies were made on rations having C/P ratios of 35 to 70. This caused little difference in rate of gain, but the content of body fat increased from 5.6 percent to 14.2 percent. The level of protein was reduced without changing the amino acid quality. In this case, body fat content increased from 5.6 percent to 9.4 percent with a corresponding decrease in moisture content.

The energy intake of the chicks also influences the percentage of dietary protein retained in the carcass. Diets were fed that varied in protein and energy content. Carcass fat content and retention of dietary protein increased as energy intake of the chick was raised at each level of protein intake.

Not only protein deficiency, but also deficiency of any essential amino acid can be expected to increase feed consumption and fat deposition before differences in growth rates are observed. Thus, methionine supplementation has been observed to improve feed conversion, even though growth rates were not affected. Eventually, amino acid requirements may be expressed in relation to energy levels. As more is learned about amino acid requirements, lower levels of improved quality protein (wider C/P ratios) may be as effective in supplying these essentials as protein levels considered satisfactory at present.

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ABSTRACTER: Neva L. Karrick

7.89 QUALITY CONTROL FOR THE CANNER AND FREEZER - BASIC PRINCIPLES AND INSTRUMENTATION CHAPTER II. - VISCOSITY AND CONSISTENCY

Kramer, Amihud and Twigg, Bernard A.
Canner and Freezer 124, 13-15 (April 29, 1957)

Importance and use. -- Viscosity or consistency is an important factor in many food products. Some specific uses are: (1) indicate consistency of the finished product, (2) quality control during processing, (3) index for adding ingredients, (4) index for duration and amount of heating, (5) indication of depolymerization, (6) determination of the constitution of polymers, and (7) determination of molecular weights.

Definition. --Liquids flow as if they were divided into layers. The friction resulting from the resistance to flow is called consistency or apparent viscosity. Fluids that are chemically pure and physically homogeneous have a constant consistency value if the static pressure and temperature are fixed; for such substances the consistency is usually called the viscosity or absolute viscosity.

Types of flow. -- Newtonian flow is exhibited by liquids in which the viscosity does not change with a change in the rate of shear. Newtonian liquids are chemically pure and physically homogeneous. Some examples are: water, most oils, and syrups.

Non-Newtonian flow is exhibited by liquids whose resistance to flow (apparent viscosity) changes with a change in rate of shear. Most consistency measurements in the food industry are made on non-Newtonian materials. Some examples are: catsup, cream style corn, and mayonnaise. Non-Newtonian materials have three main types of flow; psuedo-plastic, dilatant, and plastic.

Psuedo-plastic materials get thinner (apparent viscosity decreases) as the rate of shear increases.

Dilatant materials thicken (apparent viscosity increases) as the rate of shear increases.

Plastic materials have a yield point beyond which they act as psuedo-plastic materials. Tomato catsup is a good example of this.

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ABSTRACTER: Richard W. Nelson

TOXICITY OF FATTY ACIDS

PROTEIN NUTRITION OF CHICKS

GROWTH FACTOR ASSAYS

CONSISTENCY CONTROL

6.195

Little is known about the mechanism by which the young animal adjusts its feed consumption to compensate for dietary imbalances or stresses. The energy content and protein adequacy of the feed, however, influence the appetite. Possibly blood levels of nutrients such as blood sugars and amino acids, may affect food intake.

Laying hens housed in cages have been observed to have a fatty liver condition. This involves increase in lipid and cholesterol content of the blood with fatty encapsulation and infiltration of the kidneys. This condition may have resulted from a protein or amino acid inadequacy which caused a greater than normal energy intake.

Body composition measurements are evidently important to allow better interpretation of results and to determine more accurately requirements for protein and amino acids. Although rate of gain is still one of the most important criteria in poultry nutrition research, it is often inadequate as the only yardstick.

7.89

Another phenomenon peculiar to some materials is thixotropy. In materials with this property the apparent viscosity at any particular rate of shear depends on the amount of previous shearing (stirring, etc.).

These properties change in some products as temperature and concentration are varied.

A complete understanding of the flow properties of a product would be desirable before viscosity or consistency measurements are made in order to select the proper conditions and instruments for the measurements.

Fig. 4. Illustration of Newtonian type flow by spherical balls rolling between flat plates.

Fig. 6. Illustration of pseudo-plastic type flow by elongated particles which tend to become more spherical with an increase in rate of shear.

4.92

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to fish meal. In the opinion of Barnett and Bird certain organisms appeared to be necessary in the environment before the chick could respond to unknown growth factors.

One reason for the increased growth under conditions of contamination appeared to be the presence of substances in fish solubles that affect the growth of intestinal microorganisms in a manner favorable to the chick. This effect is analogous to the antibiotic effect. Support for this possibility stems from the fact that adenosine, adenine, and certain related compounds, if fed at 150 to 300 milligrams per kilogram of diet, will stimulate the growth of chicks under contaminated conditions. The relationship between antibiotics and unidentified factors differs between laboratories and suggests that microbial environments are involved in the responses of chicks to sources of unidentified factors.

Other methods for improving the assay for unidentified growth factors depends on: (1) the use of chicks from hens kept on diets low in unidentified factors and (2) the use of basal diet modifications. In a search for more concentrated sources of the unidentified chick-growth factors, egg yolk appeared to be a good source of several of these factors, especially the fish factor. Japanese mold culture ("koji" feed) and brewers' yeast were as active as fish meal in promoting the growth of chicks on practical rations. Fermentation material obtained from cultures of Streptomyces species B-1354 stimulated the growth of chicks and turkeys when fed in practical rations at levels of 0.35 to 1.5 percent. This increase in growth did not depend upon the presence of known antibiotics or vitamins in the fermentation material.

8.7 ORDER ON CANNED TUNA IDENTITY AND FILL-OF-CONTAINER STANDARD ISSUED

Anonymous
Department of Health, Education, and Welfare, Food and Drug Administration, Washington, D. C.
Commercial Fisheries Review 19, 61-65 (April 1957)

An order acting on the proposal to adopt definition and standards of fill of container for canned tuna was published in the Federal Register of February 13, 1957, by the Food and Drug Administration of the U. S. Department of Health, Education, and Welfare.

The standard designates the various species of fish which may be called tuna; defines the styles of pack and requires uniform names for these, namely, "solid" or "solid pack," "chunks" or "chunk style," "flake" or "flakes," and "grated," and requires an accurate labeling statement as to the color of the tuna, and provides for differentiating between the shades of color by use of a special optical instrument so that there need be no reliance on opinion as to the color. Under the standard, tuna is to be labeled as "white," "light," "dark," and "blended."

The name of the packing medium is required to be shown on the label. The permitted liquids are vegetable oils, olive oil, and water. Optional use of seasoning ingredients with appropriate label declaration is permitted.

The standards spell out the fill-of-container for each size and for each type of canned tuna. Compliance with the requirements for fill-of-container are determined by removing the contents of a can, pressing out the oil and watery juices, and weighing the press cake consisting of cooked fish of relatively uniform composition.

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9.4 RESEARCH AND QUALITY CONTROL; NEW LABORATORY IS OPENED BY THE MAINE SARDINE INDUSTRY

Anonymous
Fishing Gazette 74, 57-58 (May 1957)

A modern Maine-sardine research and quality control laboratory, located at 114 Exchange Street, Bangor, was opened formally on April 11, 1957. The well equipped, four story laboratory is manned by technical workers under the supervision of Research Director, B. S. Clark and his assistant, Ralph Berglund. Otis Anthony is laboratory manager.

Funds for the activities of the laboratory are provided by the Maine Sardine Council and are raised through a $0.25 per case tax imposed by the Maine legislature in 1951 at the request of the canners. Council headquarters are in Augusta, Maine.

Laboratory activities. -- Sardine grading is one of the chief activities of the laboratory and many thousands of cans are examined by trained personnel each year. The cans of sardines are collected at the plants by State Department of Agriculture inspectors each day and from each lot packed. At the laboratory, the cans are opened, photographed, and graded for such factors as (1) weight, (2) appearance, (3) workmanship, (4) flavor, and (5) oil and water content. The results of these examinations are sent to the individual plant owners and to the Commissioner of Agriculture. At present, the sardines are classified as either sub-standard, standard, extra-standard or fancy grade.

When a plant is having trouble with certain lots of sardines, a technician may be dispatched from the laboratory to help the plant operator locate the source of trouble and remedy it.

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ABSTRACTER: Kathryn L. Osterhaug

9.11 HYDROGRAPHY CAN HELP FISHERMAN

McLellan, H. J
Fisheries Newsletter (Australia) 16, 21-23 (April 1957)

Since the study of hydrography includes the physical variables of temperature, salinity and density in the oceans, plus the physical processes that establish or maintain these distributions, a knowledge of these can be of value in fisheries research, management programs, and in actual fishing.

Fish are sensitive to changes in environment and have definite ranges under which they prefer to live. Individual fishes can perceive and respond purposively to temperature changes as small as 0.03° C., 0.2 parts per thousand in salinity, and changes of 0.05 in pH (hydrogen ion concentrations). Fish will be found in greatest quantities where temperatures are comfortable, salinity and pH are such that assimilation, excretion and maintenance of salt balance is not too laborious, where oxygen is available in quantities suitable for easy respiration and where food is plentiful. Combinations of these factors may complicate the picture, however, even the most statistical approach to the study of fish population must consider environmental changes which may bring about variations in population, age, composition, and growth rate.

The thermometer can become as valuable as the echo-sounder in the actual fishing operations, especially when an oceanographic boundary is involved, which may be of three types: (a) bottom boundaries where isotherms meet a sloping bottom and limit ground-fish to that portion of the bottom where temperatures are suitable, (b) distinctive water masses where a certain body of water is most suitable for fish--here the boundaries may be horizontal or vertical and may completely enclose the water mass, and with it the fish concentrations, and (c) vertical boundaries, where a virtual wall separates water masses of distinctly different properties. Examples include cod long-lining off

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ABSTRACTER: Harold C. Johnson

9.7 FISHERY MOTION PICTURE

Anonymous
Commercial Fisheries Review 19, 86 (April 1957)

Fish Out of Water, is the title of a 16 mm., 14-minute sound and color motion picture produced and distributed by the U. S. Fish and Wildlife Service. The film begins with an underwater sequence and shows the catching of fish and then moves into a brief but comprehensive picture of what takes place before the fish reach the consumer. Finally it shows the proper preparation and attractive serving of the fish as food.

The film was produced with funds provided by the Saltonstall-Kennedy Act of 1954. Copies are available at 140 film libraries that distribute fishery films produced by the Bureau of Commercial Fisheries of the U. S. Fish and Wildlife Service, Washington 25, D. C.

See illustrations, over.

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ABSTRACTER: Kathryn L. Osterhaug

CANNED TUNA SPECIFICATIONS

HYDROGRAPHY FOR FISHERMEN

NEW SARDINE LABORATORY

FISHERY MOTION PICTURE

9.11

Bonavista, Newfoundland, where the fish are held off the shallow bottoms by the intermediate layer of cold water so that the best catches are made by first locating the strips of bottom where temperatures range from -0.5°to 1.0° C., and the cod fishery in the Bear Island region where fishery biologists and hydrographers have assisted the fisherman. Here two cod populations and two temperature ranges are involved: first, 1.75° to 3° C. applies to the region south of Bear Island; second from 3° to 5° C. which applies tc the west of the island. The temperature boundaries of these areas are rather narrow so it has proved beneficial to use the thermometer before fishing. The Norwegian mid-water cod fishery near Lofoten is a case of a distinct water mass. Here the cod are found in a mid-water transitional area with temperature 3° to 6.5° C.

Bottom temperatures and their seasonal variations depend largely on depth. The depth of water over a bank determines whether temperatures will: (a) follow a normal seasonal cycle, (b) remain cold all year except for brief warm-up in the late autumn, (c) be regularly cold except during years when the intermediate cold water layer is less intense, and (d) remain comparatively warm all year. These temperature variations and the difference between one bank and another are important factors in determining where fish will be caught. Although our fishermen know a great deal about the location of good fishing areas at different times of the year, a clearer picture of temperature distribution could help them towards understanding what they already know from experience.

9.7

Fig. 1. - Cameraman filming the unloading of ocean perch at Gloucester, Mass.

Fig. 2. -U.S. Department of Agriculture Inspector grading fish sticks at Gloucester, Mass.

8.7

The definition and standard of identity promulgated by this order shall become effective on February 13, 1958, and the standard of fill-of-container shall become effective 90 days after February 13, 1957, except in each case any provisions that may be stayed by the filing of exceptions thereto. Notice of the filing of objections, or lack thereof, will be announced by publication in the Federal Register.

In the meantime the Food and Drug Administration has received a request for a 60-day extension of time in which to file objections to the order promulgating a definition and standard of identity and standards of fill-of-container for canned tuna. The extension was granted by the Administration, and the March 7 Federal Register states that the time for filing objections is extended until May 13, 1957.

9.4

The grading program has been in operation for two years. Although it has been on a voluntary basis, about 90 percent of the pack has taken full advantage of this service. The results have been quality improvement and greater plant efficiency.

New legislation provides for samples of all lots from all plants to be graded. The cans are to be taken from the plants by the inspectors with the packer being reimbursed for them at cost. During the 1957 canning season the grades still will have no official status, but the recent law authorizes the Commissioner of Agriculture to issue certified grading certificates in 1958 to any packer who requests the service.

A product development test kitchen is located on the third floor of the new building. Activities here are designed to develop new ways of preparing and packing sardines and to improve the sauces and oils now in use.

Although the laboratory is the heart of the industry's efforts to improve its plants, processes and products, a number of activities are contracted out to other university, commercial and government laboratories.

The types of problems that are of interest to the laboratory include the following: (1) influence of freezing on quality and acceptability of sardines, (2) salt and moisture studies, (3) oil flavor evaluation, (4) mustard discoloration, (5) Federal specifications, (6) bacteriological studies, (7) precooking practices, (8) vacuum packs, (9) taste panels, (10) data on Maine vs. California sardines, (11) use of antibiotics in preserving fish, (12) histochemistry, (13) storage, (14) grading rules for mustard and oil packs, (15) specifications and development of $\frac{3}{4}$ institutional size can in oil, (16) smoking of oil and fish, (17) volatile reducing substances, (18) skin resistance to disintegration, (19) artificial flavors, (20) standardization of retort thermometers and gauges, (21) grading schools for inspectors and plant personnel, (22) statistical control, (23) chemical methods of analysis, (24) volatile acid determinations, and (25) in-plant grading assistance.

0.6 FISHY FLAVORS IN FOODS

Dunn, J. S.
Memorandum No. 79, 14 pp. (1956) Fishing Industry Research Institute (Portswood Road, Cape Town, South Africa)

Review of literature dealing with developments of fishy flavors in food. 63 references.

0.6 THE LABORATORY EXAMINATION OF CANNED FOODS. XI. EQUILIBRIUM RELATIVE HUMIDITY

Kefford, J. F.
Food Preservation Quarterly 17, 11-13 (March 1957)

(Abstract of this article appears under 3.337 page 7 - August 1957)

0.6 REVIEW OF INDUSTRIAL APPLICATIONS: FOODS

von Loesecke, Harry W. (U. S. Department of Agriculture, Washington, D. C.)
Analytical Chemistry 29, 647-656 (April 1957 - Part II)

This review covers food applications for the period of the past two years or since the previous review. The topics include moisture, proteins and amino acids, inorganic ions, fats and oils, enzymes, carbohydrates, vitamins, acids, color and taste, insecticide residues, contamination and spoilage, and miscellaneous. A total of 317 references are cited.

2.1121 ON THE RESISTANCE OF VARIOUS COD ENDS FIXED IN A STREAM - -II.

Taniguchi, Takeo
Bulletin of the Japanese Society of Scientific Fisheries 21, No. 9, 969-972 (1956) (English abstract, figures, and table)

2.1121 ON THE RESISTANCE OF VARIOUS COD ENDS FIXED IN A STREAM --III.

Taniguchi, Takeo
Bulletin of the Japanese Society of Scientific Fisheries 21, No. 11, 1107-1109 (1956) (English abstract, figures, and table)

2.1121 SOME PROBLEMS IN MID-WATER TRAWLING

Richardson, I. D.
World Fishing 6, 28-31 (February 1957)

(Abstract of this article appears under 2.12 page 9 - June 1957)

2.3 METHOD OF SEPARATING THE FLESH FROM THE SKIN OF FISH

Hube, Gottfried E.
U. S. Patent 2,757,413 (August 7, 1956)

This machine is designed to remove skin from fillets delivered to it by a filleting machine. Fish fillets of various sizes are accommodated with equal facility without crushing or bruising the delicate tissues. One feature of this machine takes into consideration the fact that skin thickness varies from dorsal to ventral surfaces. In skinning the fillet the machine allows for this variation and thus produces a cleaner fillet as well as a saving of flesh.

2.3 METHOD OF PREPARING FINLESS FISH FILLETS

Bartels, A. F. A. and Jobmann, P. F. W.
U. S. Patent 2,771,633 (November 27, 1956)

This device relates to a method of preparing fillets from fish having deep seated fin rays. A headless fish is firmly supported, with dorsal surface downward, by grooves and suitable clamping mechanism arranged around the circumference of a wheel. As the wheel rotates, circular knives excise the various fins by cutting deeply into and parallel to the fin rays. Belly walls containing the pectoral fins are cut away with little waste. A final pair of knives, cutting through the dorsal surface on each side of the back bone, removes the back bone and thus separates the fish into two equal finless fillets.

3.12 IS TOXICOLOGY ENOUGH FOR A FOOD PROTECTION PROGRAM?

Mickelsen, Olaf (Public Health Service, U. S. Department of Health, Education, and Welfare, Bethesda, Maryland)
Journal of the American Dietetic Association 33, 341-346 (April 1957)

3.12 BLACK SPOT ON PRAWNS

Anonymous
Food Manufacture 32, 175 (April 1, 1957)

(Abstract of this article appears under 2.03 page 3 - July 1957)

3.12 SPOILAGE OF FISH AND ITS PRESERVATION BY CHEMICAL AGENTS

Tomiyasu, Yukio and Zenitani, Buhei (Kyushu Univ., Fukuoka)
Advances in Food Research (Academic Press, Inc., New York, N. Y.) 7, 41-82 (1957)
Chemical Abstracts 51, 6025 (April 25, 1957)

3.235 TECHNOLOGICAL RESEARCH WITH SOUTHERN OYSTERS

Lee, Charles F.; Pepper, Leonard
Southern Fisherman 16, 55 (April 1956)

(Abstract of this article appears under 1.81 page 1 - August 1956)

3.235 REFRIGERATION OF FISH. PART 4. PREPARATION, FREEZING, AND COLD STORAGE OF FISH, SHELLFISH, AND PRECOOKED FISHERY PRODUCTS

Dassow, John A.; Pottinger, S. R.; and Holston, John
Fishery Leaflet 430 (1956)

(Abstract of this article appears under 3.23 page 7 - December 1956)

3.235 OYSTER BISQUE FORMULA

Anonymous
Food Engineering 28, 169 (October 1956)

In a kettle, melt 17½ oz. of margarine. To it, add 8¾ oz. of flour, and blend. Now slowly add, with mixing until thick and smooth, 49 lb. of heated (160° F.) milk. Add liquor drained from oysters, 8 1/5 oz. of parsley, 2 1/8 oz. of celery salt, and 2½ oz of paprika.

Introduce, a little at a time, 3½ lb. of beaten eggs. And finally add 24½ lb. of cooked oysters finely ground).

3.24 THE FROZEN FOOD CONFERENCE PART II. RECOMMENDED PRACTICES FOR HANDLING FROZEN FRUITS AND VEGETABLES

Dykstra, K. G.
Refrigerating Engineering 64, 54-57, 106, 108-109 (September 1956)

3.24 THE FROZEN FOODS CONFERENCE. PART II. PROPER METHODS FOR HANDLING FROZEN POULTRY AND EGGS

Loy, W. C.
Refrigerating Engineering 64, 58-60 (September 1956)

3.24 THE FROZEN FOOD CONFERENCE. PART II. HOW TO HANDLE FROZEN CITRUS FOODS

Allegri, Theodore H.
Refrigerating Engineering 64, 60-61, 109-110, 112-118 (September 1956)

3.33 BOTTLING CLAM JUICE

Anonymous
Food Engineering 28, 158 (August 1956)

Pipe liquor from clam steamer into storage tank. Then run the juice through a mechanical filter, pasteurize 5 minutes at 180° F., and immediately fill into ½-pint bottle with crown-type seal or No. 1 picnic-size cans.

The cans, for example, can be heat-processed in retorts for ½ hour at 240° F., then immediately water-cooled.

3.33 QUALITY OF SARDINES (CLUPEA PILCHARDUS WALB.) HELD UNFROZEN AND FROZEN PRIOR TO CANNING

MacCallum, W. A.; Dyer, W. J., Curi, S.; Simoncic, J. J.; Kovacevic, M.; Horne, D. C.; McNeill, R. J.; Krvaric, M., and Lisac, H.
Food Technology 10, 432-438 (September 1956)

(Abstract of this article appears under 1.2 page 1 - March 1957)

3.33 FISH PASTE

Anonymous
Food Manufacture 31, 499 (November 1, 1956)

3.39 EVALUATION OF AMINO ACIDS IN FISH PROCESSED BY VARIOUS METHODS

Proctor, B. E. and Lahiry, N. L.
Food Research 33, 91-92 (January-February 1956)

(Abstract of this article appears under 7.522 page 15 - August 1956)

3.39 CONDITIONS OF THE FORMATION OF THE STAPHYLOCCOCAL ENTEROTOXIN IN BUTTER-CANNED FISH AND THE EFFECT ON IT OF DIFFERENT STERILIZATION REGIMES

Nefed'eva, N. P. (Nutrition Inst., Acad. Med. Sci. U.S.S.R., Moscow)
Voprosy Pitaniya 14, No. 6, 21-6 (1955)
Chemical Abstracts 50, 17238 (November 25, 1956)

Staphyloccocal toxins (I) obtained by growing the bacteria in a semifluid contg. 0.75% agar and 0.25% glucose with Gottinger broth as solvent were injected in the ear veins of cats in the amt. of 0.2-0.3 ml./kg. body wt., as a means of detecting enterotoxin poisoning. The method is highly specific: a pos. reaction (vomiting) was obtained only by the I isolated during the food poisoning; the bacteria from the air and pus failed to give a pos. reaction. By making use of this method the presence of I in the filtrates of fluid cultures and in butter-canned fish at 37° after one day and at room temp. after 20 days; hemolysin is formed at 37° only after 3-10 days, while at room temp. it was not formed after 6 months. To destroy I in the canned fish 35-min. sterilization at 120° is required.

3.6 DEHYDRATION OF FOOD

Anonymous
Catalog of Technical Reports, No. 191, 6 pp. (April 1954) Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

3.6 SMOKE CURING AND DRYING

Anonymous
Report of the Food Investigation Board (Great Britain) for 1954, pp. 40-44 (1955)

(Abstract of this article appears under 3.4 page 9 - July 1957)

3.6 ON THE DENATURATION OF FISH MUSCLE PROTEINS BY DEHYDRATION

Migita, Masao; Matsumoto, Juichiro J.; and Saishu, Tomiko
Bulletin of the Japanese Society of Scientific Fisheries 22, No. 7, 433-439 (1956) (English synopsis and figures)

Both in muscles of flatfish and of squid, the salt-extractable proteins and the myosins decreased in parallel to the dehydration but the non-myosins kept a constant level throughout the procedure.

4.4 APPLICATION OF CHROMATOGRAPHY TO SEPARATION PROBLEMS IN THE LIPID FIELD

Holman, R. T.
Annual Report of the Hormel Institute 1955-56, 32-35 (1956)

(Abstract of this article appears under 4.11 page 17 - April 1957)

4.4 STUDIES ON A KIND OF DISCOLORATION OF FISH OIL

Nonaka, Junsaku
Bulletin of the Japanese Society of Scientific Fisheries 21, No. 12, 1244-1252 (1956) (English abstract and tables)

XI. On treatment, all the carbonyl compounds here studied gave coloring substance very similar to that found in so-called oxidized acid in so far as they belong to a half aldehyde longer than glutaric half aldehyde.
XII. A study of the application of paper-partition chromatography to 2,4-dinitrophenylhaydrozones of acidic carbonyl compounds.
XIII. At least part of the characteristic color of oxidized acid, as well as the main coloring matter of discolored oil, springs from half aldehyde formed in the oil.

4.5 THE RELATION BETWEEN THE RUSTING COLOR AND THE AMOUNT OF OXIDIZED ACID OF BOILED AND DRIED FISHES

Ando, Kazuo
Bulletin of the Japanese Society of Scientific Fisheries 21, No. 3, 206-211 (1956) (English synopsis and table)

A positive relation exists between the variation in the amount of oxidized acid and the gradation of brown color in the oil.

4.5 POLAROGRAPHIC STUDIES ON THE RANCID FISH OIL I.

Kikuchi, Takeaki and Okada, Ikunosuke
Bulletin of the Japanese Society of Scientific Fisheries 22, No. 9, 589-592 (1956) (English synopsis and figure)

The authors applied polarography to studies on the autoxidation of fish-oil. They found a well defined polarographic wave that was caused by the oxidation product of fish-oil.

4.5 BEHAVIOR OF COD LIVER OIL

Taufel, K.; Haase, H. J.; and Vogel, R. (Inst. Ernahrungsforsch., Potsdam-Rehbrucke, Ger.)
Pharmazie 8, 636-8 (1953)
Chemical Abstracts 51, 3928 (March 10, 1957)

Apart from vitamins A and D and the common fat consts., codliver oil for medicinal use should be considered as to the state of oxidation (Lea no.), results of autoxidation and tendency to polymerization.

4.61 THE PROTECTION METHOD OF MARINE PRODUCTS FROM THEIR DETERIORATION DUE TO THE OXIDATION OF OIL

Toyama, Kenzo; Tochi, Tetsuaki; and Saruya, Kuman
Bulletin of the Japanese Society of Scientific Fisheries 21, No. 3, 198-205 (1956) (English abstract and tables)

V. Application of BHA to salting of salmon.
VI. Application of butylated hydroxy anisole (BHA) to dry-salting of salmon.

4.61 THE PROTECTION METHOD OF MARINE PRODUCTS FROM THEIR DETERIORATION DUE TO THE OXIDATION OF OIL

Toyama, Kenzo; Yamaguchi, Noriyuki; and Saruya, Kuman
Bulletin of the Japanese Society of Scientific Fisheries 22, No. 6, 383-385 (1956) (English synopsis and table)

VIII. The protection of Aramaki (a sort of mildly salted salmon) by BHT from their deterioration due to the oxidation of oil.

4.61 STABILIZATION DURING RENDERING

Dugan, L. R. and Wilder, O. H. M.
Amer. Meat Inst. Found., Chicago, Circ. No. 18, 15 pp. (1955)
Food Science Abstracts 28, 487 (October 1956)

A review. Figures are given to show the effect of anti-oxidants in increasing the stability of meat scrap, as measured by the active oxygen and the Schaal oven methods.

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

Analyst
Analytical Chemistry
Archives of Biochemistry and Biophysics
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner and Freezer
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemical Processing
Chemistry and Industry
Commercial Fisheries Review
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feed Bag
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fishing Gazette
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Science Abstracts
Food Technology
Frosted Food Field
Gourmet
Industrial and Engineering Chemistry
Industrial Refrigeration
Institutions
Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Nutrition
Journal of Organic Chemistry
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Chemical Society (London)
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Modern Packaging
Modern Refrigeration
National Fisherman
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fisheries Abstracts
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

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Editorial Clerk (Typist)--Gladys K. Chandler

6.132 FISH MEAL FOR HUMAN CONSUMPTION

Anonymous
Food Manufacture 31, 159 (April 1, 1956)

(Abstract of this article appears under 6.54 page 15 - December 1956)

6.132 A STUDY OF RETENTION TIME IN A ROTARY DRIER

Miskell, F. and Marshall, W. R.
Chem. Engng. Progr. 52, 35J-38J (1956)
Food Science Abstracts 28, 537 (October 1956)

A study was made of the effect of loading of the drier on the extent to which the solid particles through the drier was followed by means of a radioactive tracer in the feed and Geiger-Mueller tube fixed near the conveyor belt carrying the dried material from the drier.

6.132 FISH MEAL SUITABLE FOR HUMAN AND ANIMAL FOOD

Salomon, Arnold
Dutch 80,034 (December 15, 1955)
Chemical Abstracts 50, 17252 (November 25, 1956)

A film of very finely divided raw fish or fish meat is dried on rollers, and the dried product is defatted if desired. In the case of highly fat fish an emulsifier, such as lecithin, or a fat-absorbing material, such as bran, may be added to improve the attaching to the rollers. By this method the loss of stickwater contg. sol. and easily digestible proteins and vitamins is prevented.

6.190 THE PEPSIN-DIGEST-RESIDUE (PDR) AMINO ACID INDEX OF NET PROTEIN UTILIZATION

Sheffner, A. Leonard, Eckfeldt, Gladys A.; and Spector, Harry
The Journal of Nutrition 60, 105-120 (September 10, 1956)

(Abstract of this article appears under 0.7 page 1 - April 1957)

6.190 STUDIES ON UTILIZATION OF WASTES IN PROCESSING SHELLFISH

Tomiyama, Tetuo; Yone, Yasuo; Kato, Yoshitaro; Kanda, Jun; Koyanagi, Takeo; Okamoto, Masao; Yamaoka, Makoto; Uchida, Shogoro; Kato, Goro; Tanaka, Sasaku; and Murakami, Yukio
Bulletin of the Japanese Society of Scientific Fisheries 21, No. 6, 429-436 (1955) (English abstract, tables, and figures)

I. Effect on chick growth and egg production. Boiled extracts of Venerupis philippinarum, Pecten laqeatus, Mactra sachalinensis, and Anadara inflata given at a 3.6-percent dry basis level showed the same growth promoting effect as the fish meal at 20 percent level.

II. The effect of the boiled extract of Venerupis philippinarum upon chick growth and increase of egg production during molting season. The boiled extract of Venerupis philippinarum given ad libitum at 2-to 3-percent dry basis levels for 6 months showed a marked effect on the growth.

6.193 RECENT DEVELOPMENTS IN STUDIES ON GROWTH FACTORS FOR RUMEN MICROORGANISMS

Bentley, Orville G. and Klosterman, Earle W. (Ohio Agricultural Experiment Station)
Proceedings Distillers Feed Conference 11, 11-15 (March 7, 1956)

(Abstract of this article appears under 7.642 page 17 - November 1956)

6.193 STUDIES ON UTILIZATION OF WASTES IN PROCESSING SHELLFISH

Tomiyama, Tetuo; Yone, Yasuo; Harada, Yuzo; Kato, Yoshitaro; Okamoto, Masao; Yamaoka, Makoto; Koyanagi, Takeo; Uchida, Shogoro; Kato, Goro; Murakami, Yukio; Tanaka, Sasaku; and Matsuo, Shinichi
Bulletin of the Japanese Society of Scientific Fisheries 22, No. 6, 374-377 (1956) (English synopsis and tables)

V. The effect of viscera-extract of Atrina pectinata japonica on chick growth and egg production.

6.193 STUDIES ON UTILIZATION OF TRIMMINGS WASTED IN MANUFACTURING "KAMABOKO", A COOKED FISH CAKE

Tomiyama, Tetuo; Yone, Yasuo; Hirowatari, Kazuyuki; Koyanagi, Takeo; Uchida, Shogoro; and Tokuda, Hisao
Bulletin of the Japanese Society of Scientific Fisheries 21, No. 10, 1093-1096 (1956) (English abstract and tables)

6.3 STUDIES ON THE PREPARATION AND PURIFICATION OF ALGINIC ACID BY ELECTRODIALYSIS

Kojima, Yoshio
Bulletin of the Japanese Society of Scientific Fisheries 21, No. 2, 104-111, No. 3, 180-194 (1956) (English abstract, figures, and tables)

III. On the preparation of alginic acid by electrodialysis with three chambers.
IV. On the decolorization of alginic acid with chlorine gas blowing.
V. Electrolytic bleaching and electrodialytic preparation of decolorized alginic acid.
VI. On the diaphragm for electrodialysis.
VIII. On the electrode.

6.3 CHEMICAL STUDIES ON VOLATILE CONSTITUENTS OF SEAWEEDS

Katayama, Teruhisa
Bulletin of the Japanese Society of Scientific Fisheries 22, No. 4, 244-256 (1956) (English abstract, tables, and figures)

VII. Flavor and other characteristics of Porphyra tenera K.
X. Antibacterial action of Enteromorpha sp.
XI. Anthelmintic action of volatile compounds of seaweed.
XII. Effect on muscle contraction of earthworms.

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7.51 STUDIES ON THE PROTEINS OF SHELLFISH.

Baba, Haruo
Bulletin of the Japanese Society of Scientific Fisheries 22, No. 7, 420-423 (1956) (English synopsis, figures, and tables)

II. Pretreatment preventing the adsorption of proteins by paper in the paper-electrophoresis of low ionic strength extracts of muscles of clam, Meretrix meretrix.

7.51 DETERMINATION OF PROTEIN CONTENT OF FISH FROM THEIR ALBUMINOID AMMONIA VALUES

Mitra, S. N. (W. Bengal Public Health Lab., Calcutta)
J. Sci. Ind. Research (India) 15C, 100 (1956)
Chemical Abstracts 50, 13324 (September 25, 1956)

Weigh 2 g. of the well-macerated fish (edible portion) into a 250-ml. beaker, add 50 ml. distd. H_2O followed by 20 ml. 30% NaOH soln., and heat on a boiling water bath, with occasional stirring, for about 1 hr.; in this time the sample should go into soln. Transfer the alk. soln., with the aid of hot H_2O, into a 500 ml. volumetric flask; after cooling, make up to mark with H_2O. Pipet a 5-ml. aliquot of soln. into a distn. flask, add 245 ml. distd. H_2O and a little powd. pumice, and distill in the usual manner by using 1 g. solid $KMnO_4$ with 50 ml. alk. permanganate reagent for the second distn. Nesslerize the NH_3 obtained in the second distn. and match with standard NH_4Cl soln.

7.7 REPORT ON FISH AND OTHER MARINE PRODUCTS

Voth, Menno D. (Food and Drug Administration, Department of Health, Education, and Welfare, Seattle, Washington)
Journal of the Association of Official Agricultural Chemists 39, 603 (August 15, 1956)

The first action method for total solids in fish and other marine products except raw oysters was tried on several new products. Good results were again obtained. Collaborative work was also continued on the rapid sorting method for ether extract in canned fish, and the method was applied to fish other than canned salmon.

7.7 CHROMATOGRAPHY IN FISH TAXONOMY

Viswanathan, R. and Pillai, V. Krishna (Central Marine Fisheries Research Sta., Mandapam)
Proc. Indian Acad. Sci. 43B, 334-9 (1956)
Chemical Abstracts 50, 17240 (November 25, 1956)

Differences between species of fish can be detd. by paper partition chromatography. Standard conditions for chromatographic analysis of fresh and preserved fish muscle are described.

7.89 DETECTING HYDROGENATED FISH FAT IN BUTTER. PAPER ADSORPTION OF FAT AND SOLUTIONS ACCORDING TO TORTELLI-JAFFE REACTION, AND SUCCESSIVE EXAMINATION IN ULTRAVIOLET LIGHT

Cerutti, Giuseppe
Latte 29, 855-6 (1955)
Chemical Abstracts 50, 8932 (June 25, 1956)

Both the adsorbed fat and its products by the Tortelli-Jaffe treatment showed a fluorescence in ultraviolet light if dolphin or other fish oils, and not if genuine butter or sheep butter or coconut oil, were present.

7.89 A RECORDING STRAIN GAGE DENTURE TENDEROMETER FOR FOODS. III. CORRELATION WITH SUBJECTIVE TESTS AND THE CANCO TENDEROMETER

Proctor, Bernard E.; Davison, Sol; and Brody, Aaron L. (Department of Food Technology, Massachusetts Institute of Technology, Cambridge, Massachusetts)
Food Technology 10, 344-346 (August 1956)

The results on the denture tenderometer have shown a high degree of correlation with subjective panel results and with the Canco tenderometer.

8.51 MYOGLOBIN AND HEMOGLOBIN OF SEA-FISHES. CRYSTALLIZATION AND SOME BIOCHEMICAL PROPERTIES

Fanelli-Rossi, A. and Antonini, E. (Univ. Rome)
Congr. intern. biochim., Resumes communs 3^{e} Congr., Brussels 16 (1955) (In English)
Chemical Abstracts 50, 12146 (September 10, 1956)

8.51 EUGLOBULINS OF FISH

Drilhon, Andre
Compt. red. soc. biol. 149, 2124-2126 (1955)
Chemical Abstracts 50, 13307 (September 25, 1956)

8.51 (Cross Reference: 1.84)

CONTRACTILE PROTEINS FROM ADDUCTORS OF PECTEN. II. INTERACTION WITH ADENOSINE TRIPHOSPHATE

Tonomura, Yuji; Yagi, Koichi; and Matsumiya, Kiroyuki
Archives of Biochemistry and Biophysics 64, 466-479 (October 1956)

From the results of salting-out analysis, it is concluded that both the fast and the slow adductor myosin B's are constituted mostly of actomyosin and myosin.

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United States
Department of the Interior
Fish and Wildlife Service
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